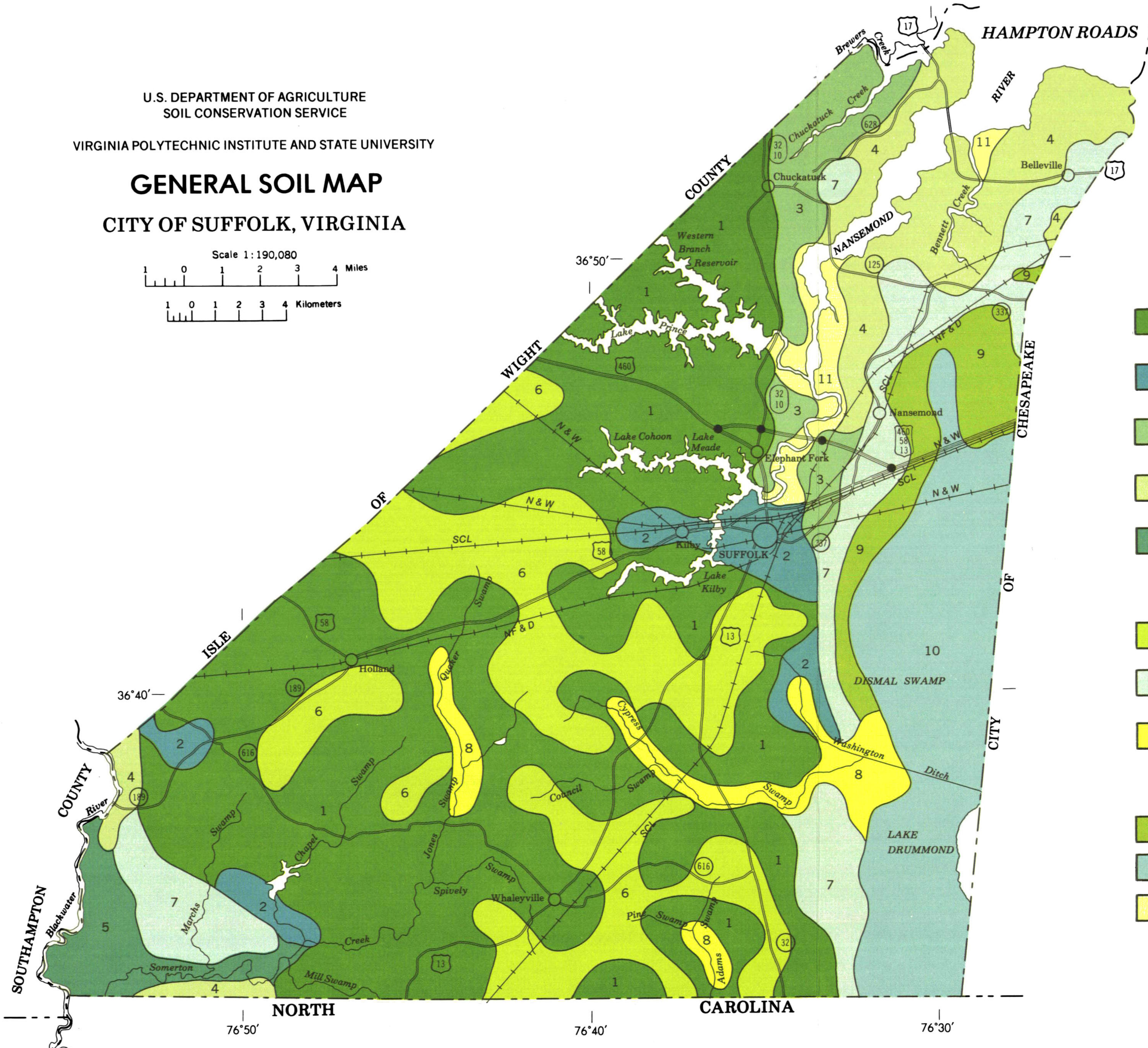
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

GENERAL SOIL MAP

CITY OF SUFFOLK, VIRGINIA

Scale 1 : 190,080



LEGEND

AREAS DOMINATED BY MODERATELY WELL DRAINED AND WELL DRAINED SOILS THAT ARE NOT FLOODED

1 Eunola-Kenansville-Suffolk association: Moderately well drained and well drained soils that have a subsoil of mostly fine sandy loam and sandy clay loam; on uplands

2 Goldsboro-Dogue-Emporia association: Moderately well drained and well drained soils that have a subsoil of mostly loam, sandy clay loam, clay loam, sandy clay, and clay; on uplands

3 Tetotum-State-Nansemond association: Moderately well drained and well drained soils that have a subsoil of mostly fine sandy loam, sandy clay loam, loam, and loamy fine sand; on uplands

4 Nansemond-Kalmia association: Moderately well drained and well drained soils that have a subsoil of mostly fine sandy loam, loamy fine sand, and sandy clay loam; on uplands

5 Pactolus-Torhunta-Alaga association: Moderately well drained, very poorly drained, and well drained soils that have a subsoil of mostly loamy fine sand, fine sandy loam, and loamy sand below the surface layer; on uplands flats

AREAS DOMINATED BY POORLY DRAINED AND SOMEWHAT POORLY DRAINED SOILS THAT HAVE WATER ON THE SURFACE FOR BRIEF PERIODS

6 Rains-Lynchburg association: Poorly drained and somewhat poorly drained soils that have a subsoil of mostly loam and sandy clay loam; on upland flats

7 Tomotley-Weston-Dragston association: Poorly drained and somewhat poorly drained soils that have a subsoil of mostly loam, sandy clay loam, and fine sandy loam; on low-lying flats

8 Levy-Rains-Lynchburg association: Very poorly drained, poorly drained, and somewhat poorly drained soils that have a subsoil of mostly clay, loam, and sandy clay loam below the surface layer; in low-lying swamps

AREAS DOMINATED BY VERY POORLY DRAINED SOILS THAT ARE SUBJECT TO FLOODING FOR LONG PERIODS

9 Torhunta-Deloss association: Very poorly drained soils that have a subsoil of mostly fine sandy loam and sandy clay loam; in the Dismal Swamp

10 Pungo-Belhaven association: Very poorly drained soils that have a subsoil of mostly organic material below the surface layer; in the Dismal Swamp

11 Bohicket association: Very poorly drained soils that have a subsoil of mostly siltly clay below the surface layer; in tidal marshes

November 1980

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

1-15598

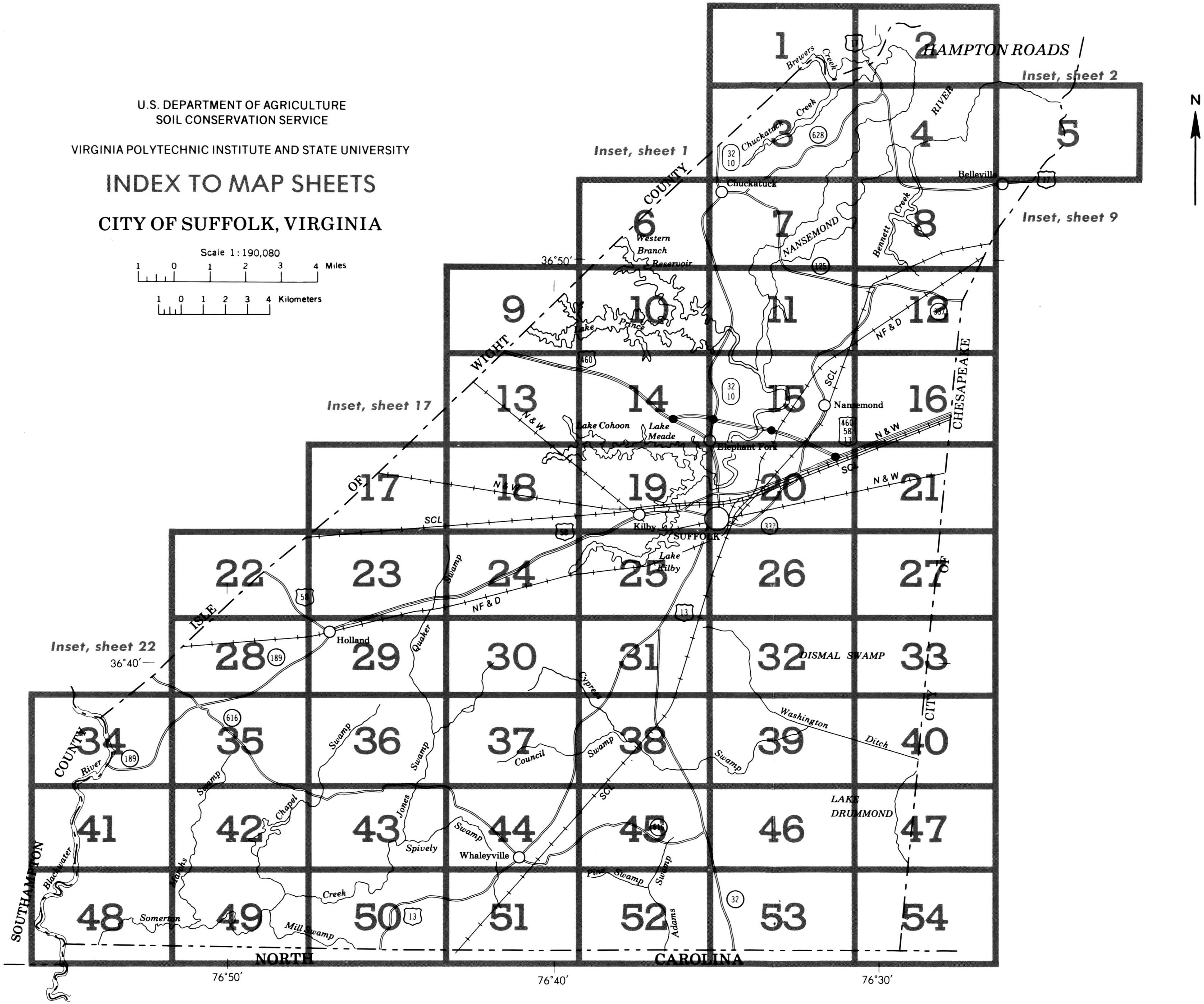
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

INDEX TO MAP SHEETS

CITY OF SUFFOLK, VIRGINIA

Scale 1:190,080



1-15598

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oil field, cemetery, or flood pool — Davis Airstrip; FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52
- County, farm or ranch — 378

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPELINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water; w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — int; i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CeA; FoB2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) — S

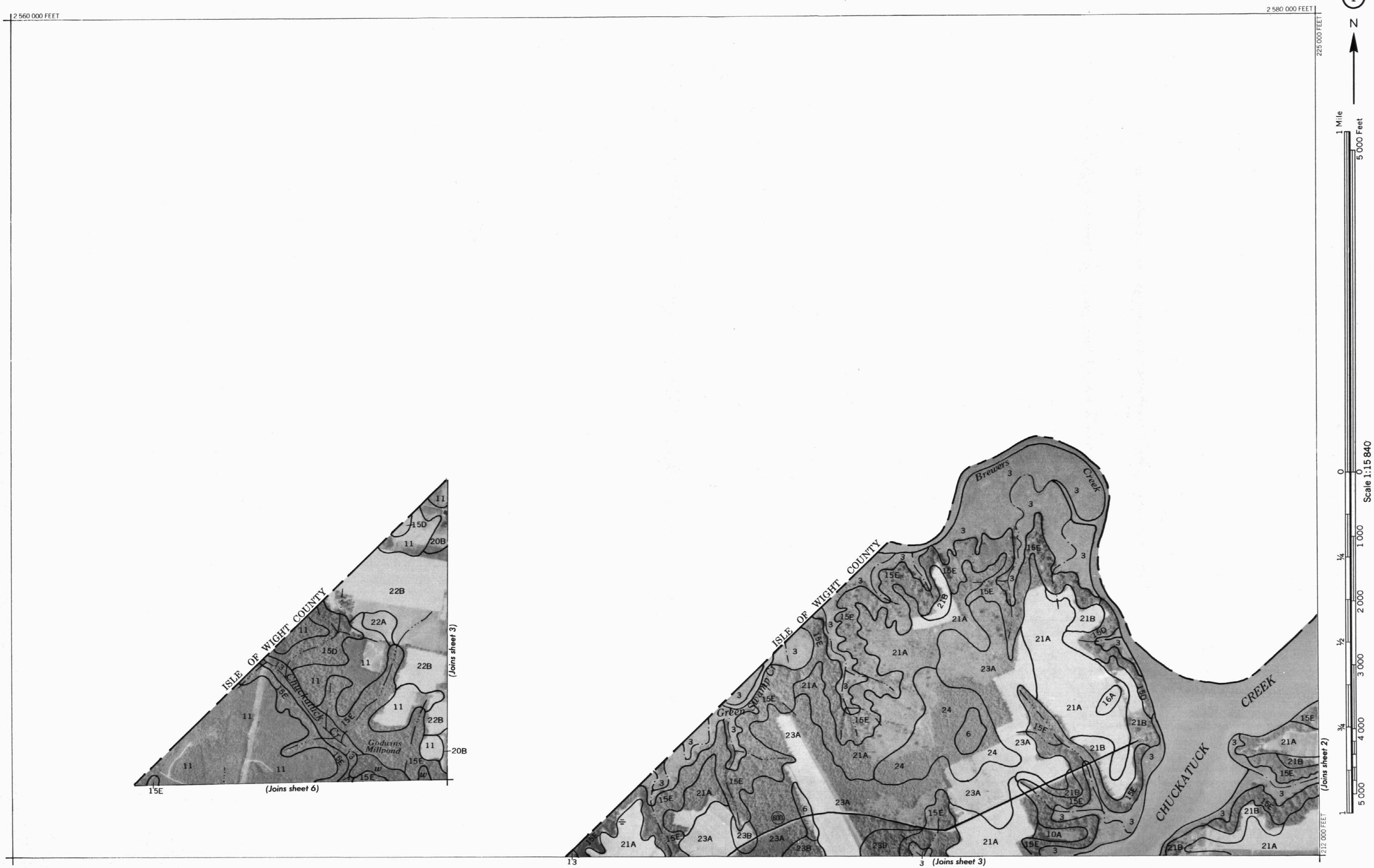
MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy Spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

SOIL LEGEND

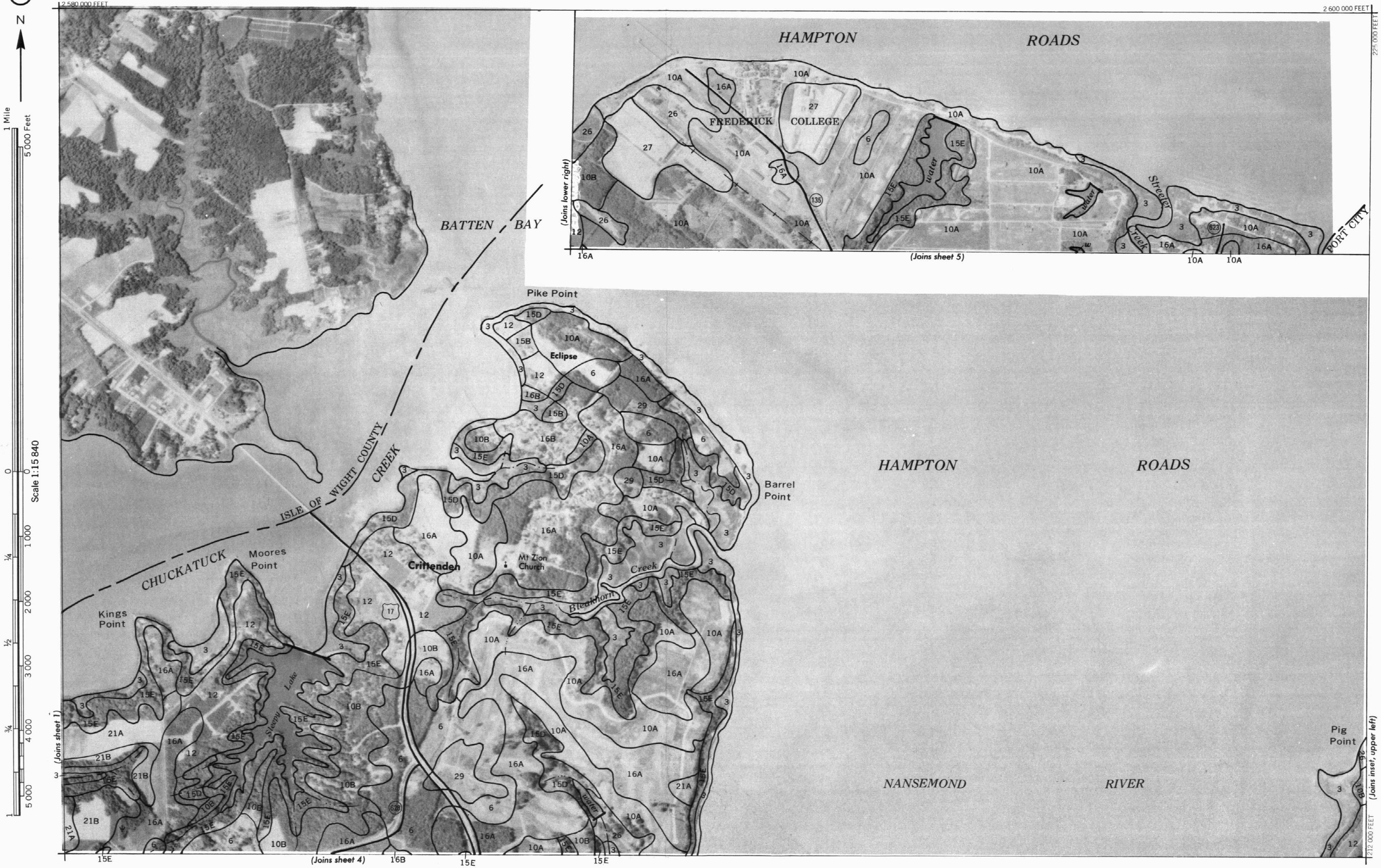
Map symbols consist of numbers or a combination of numbers and letters (e.g., 12, 8B, or 9B2). A capital letter of A, B, C, D, or E following a number indicates the class of slope. Symbols without a slope letter are for nearly level soils, soils with a wide range in slope, or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is eroded.

SYMBOL	NAME
1B	Alaga loamy sand, wet substratum, 2 to 8 percent slopes
2	Belhaven muck
3	Bohicket silty clay loam
4	Deloss mucky loam
5A	Dogue fine sandy loam, 0 to 2 percent slopes
5B2	Dogue fine sandy loam, 2 to 6 percent slopes, eroded
6	Dragston fine sandy loam
7A	Emporia fine sandy loam, 0 to 2 percent slopes
7B2	Emporia fine sandy loam, 2 to 6 percent slopes, eroded
8A	Eunola loamy fine sand, 0 to 2 percent slopes
8B	Eunola loamy fine sand, 2 to 6 percent slopes
9A	Goldsboro fine sandy loam, 0 to 2 percent slopes
9B2	Goldsboro fine sandy loam, 2 to 5 percent slopes, eroded
10A	Kalmia fine sandy loam, wet substratum, 0 to 2 percent slopes
10B	Kalmia fine sandy loam, wet substratum, 2 to 6 percent slopes
11	Kenansville loamy sand, 0 to 4 percent slopes
12	Kenansville loamy sand, wet substratum, 0 to 4 percent slopes
13	Levy silty clay loam
14	Lynchburg fine sandy loam
15B	Nansemond loamy fine sand, 0 to 6 percent slopes
15D	Nansemond loamy fine sand, 6 to 15 percent slopes
15E	Nansemond loamy fine sand, 15 to 30 percent slopes
16A	Nansemond fine sandy loam, 0 to 2 percent slopes
16B	Nansemond fine sandy loam, 2 to 6 percent slopes
17	Pactolus loamy fine sand
18	Pungo muck
19	Rains fine sandy loam
20A	Rumford loamy fine sand, 0 to 2 percent slopes
20B	Rumford loamy fine sand, 2 to 6 percent slopes
21A	State fine sandy loam, 0 to 2 percent slopes
21B	State fine sandy loam, 2 to 6 percent slopes
22A	Suffolk loamy sand, 0 to 2 percent slopes
22B	Suffolk loamy sand, 2 to 6 percent slopes
23A	Tetotum fine sandy loam, 0 to 2 percent slopes
23B	Tetotum fine sandy loam, 2 to 6 percent slopes
24	Tomotley loam
25	Torhunta loam
26	Udorthents, loamy
27	Urban land
28	Wahee silt loam
29	Weston fine sandy loam
W	Water



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

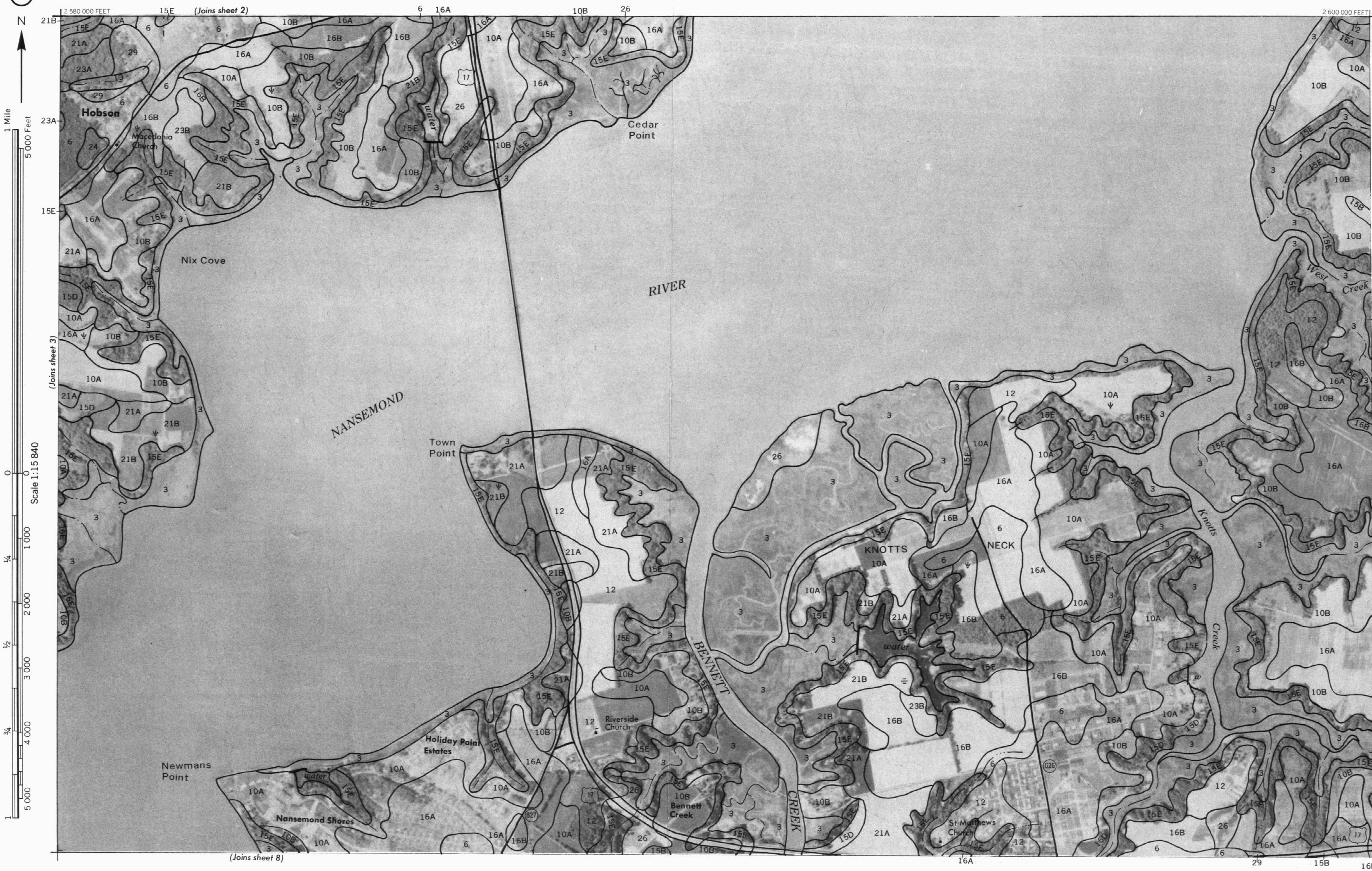
CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 2



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

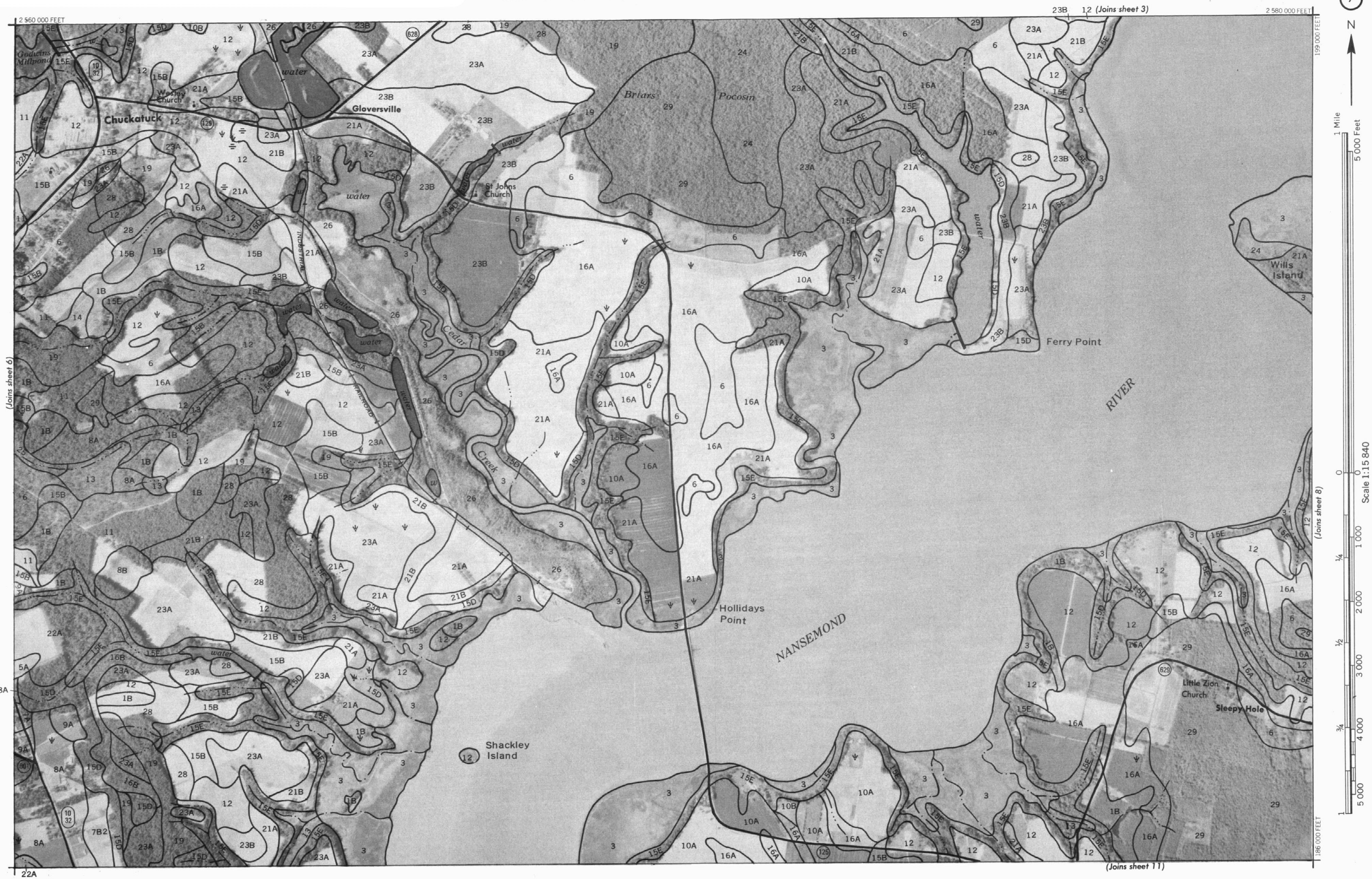
CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 4



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

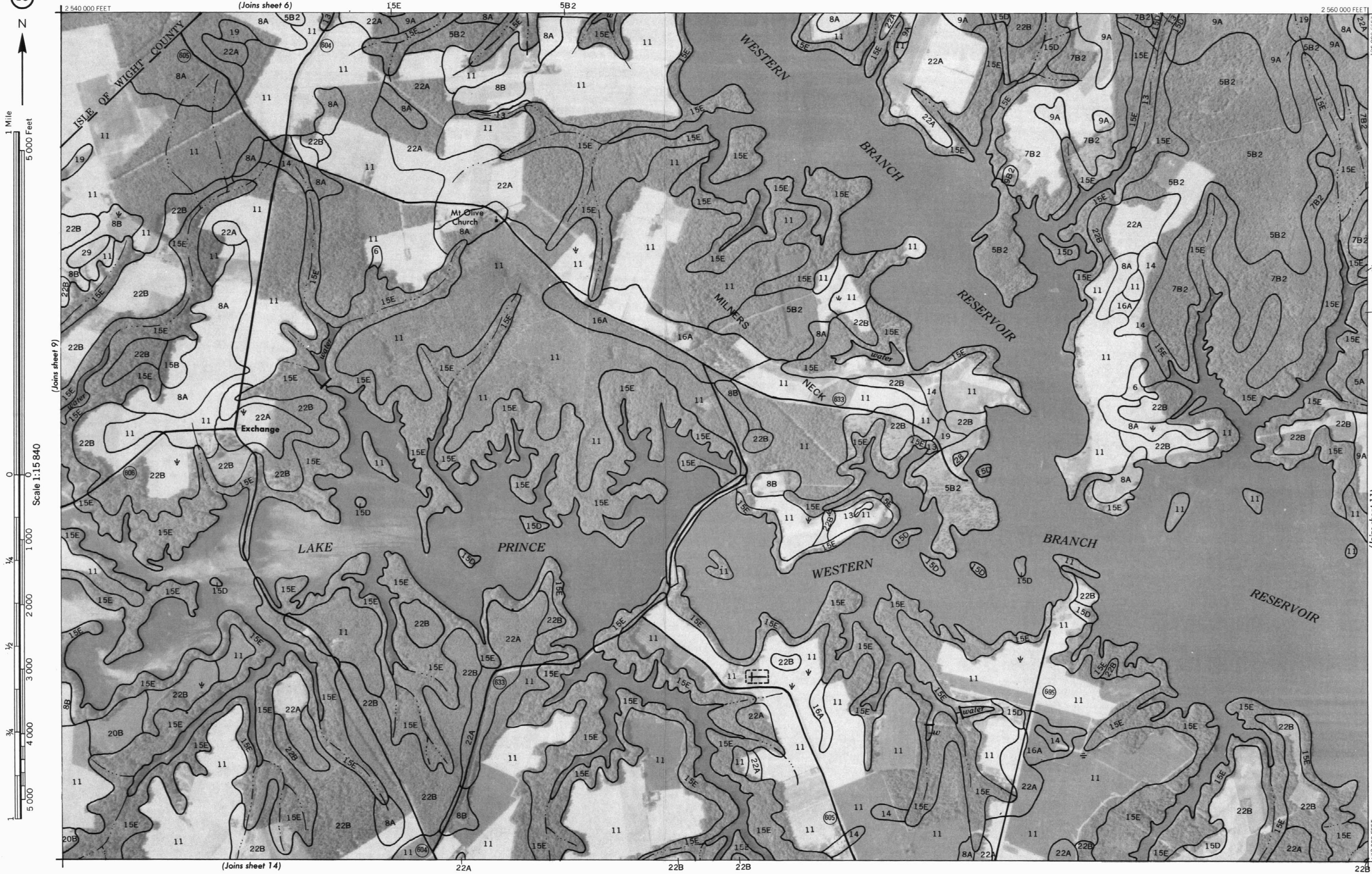


This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 8

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 10



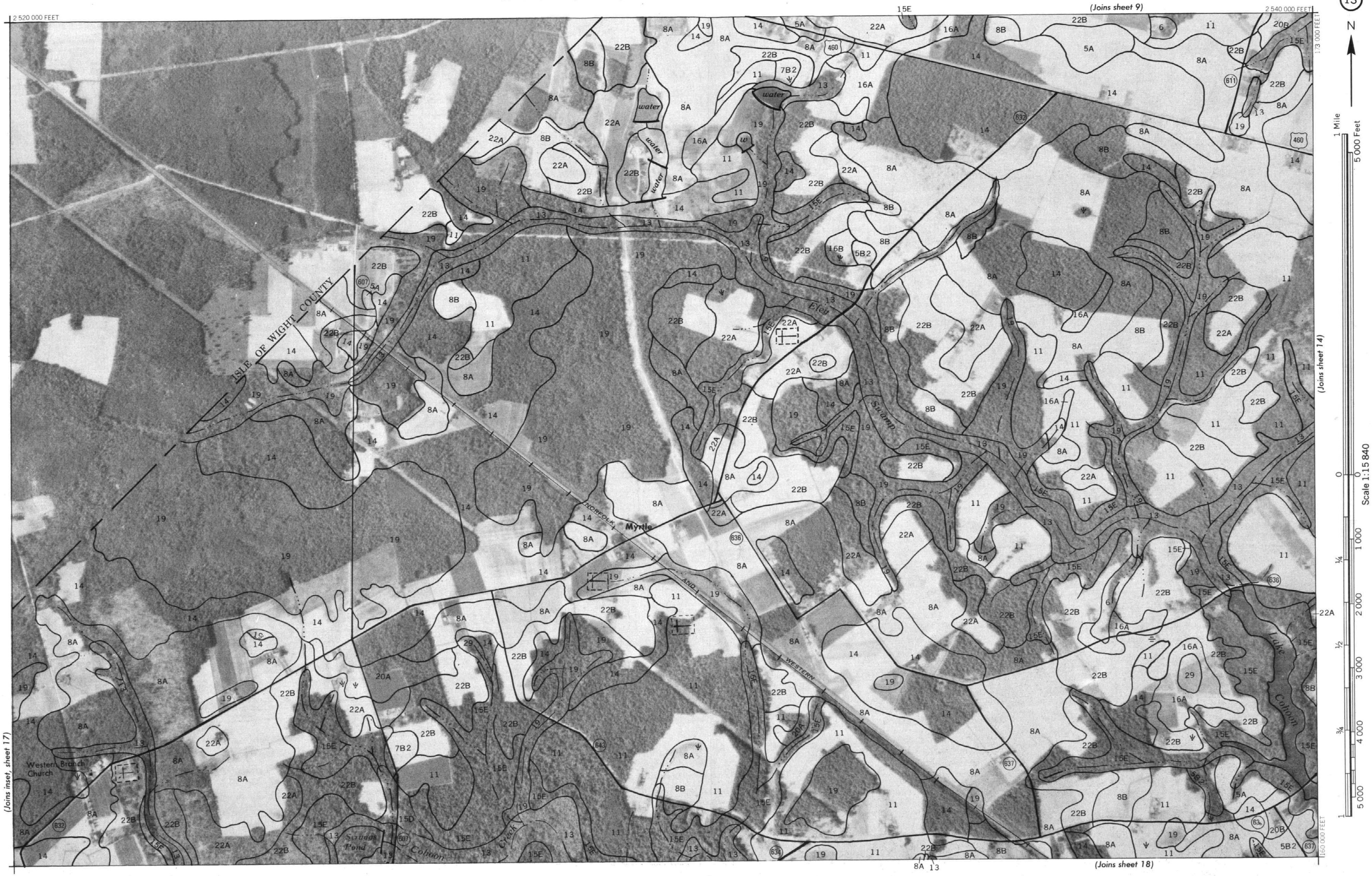
This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 12

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 13



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

14

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 14

1 Mile
5 000 Feet
0
Scale 1:15 840
1 000
2 000
3 000
4 000
5 000
1/4
1/2
3/4
1

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

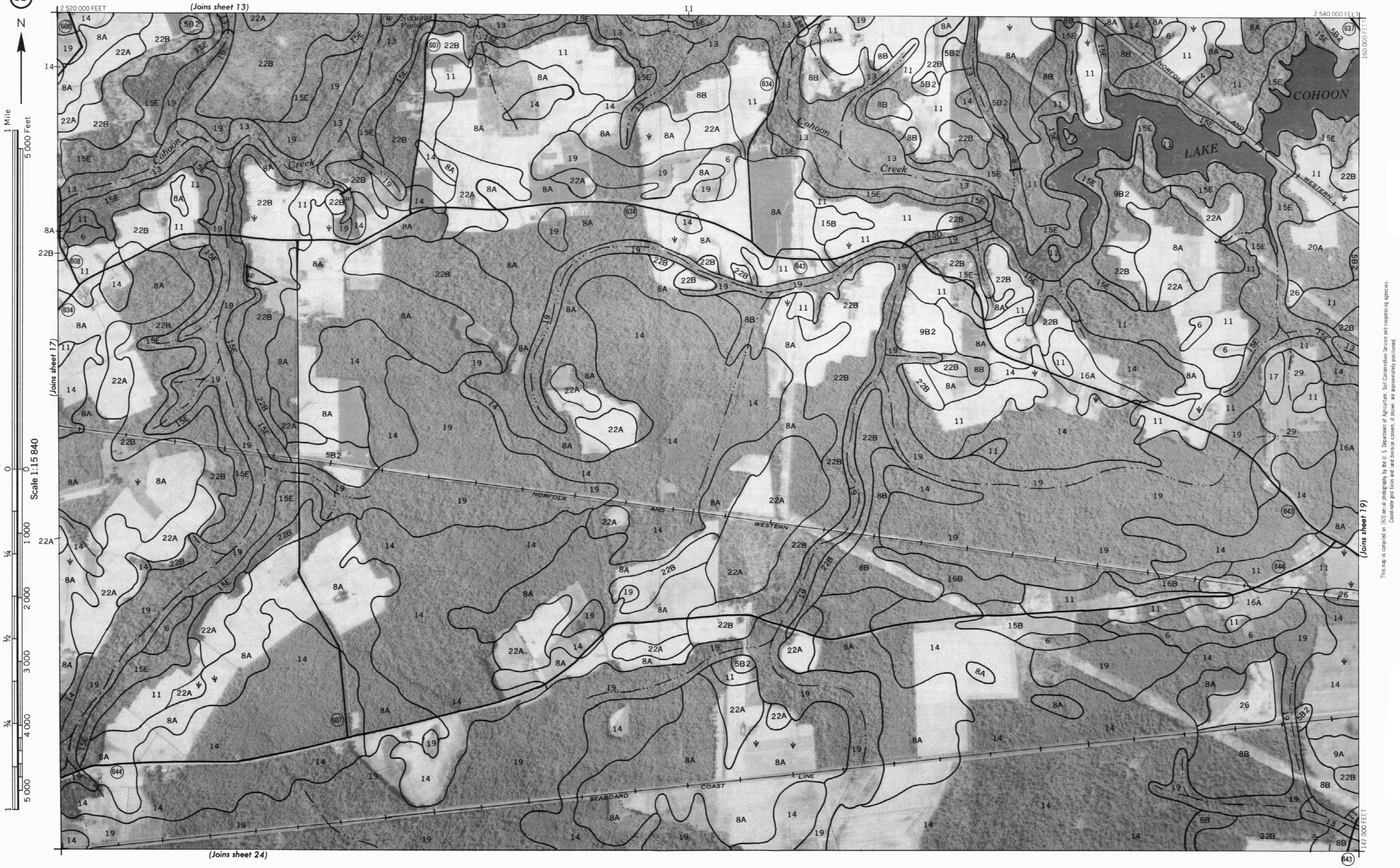
16

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 16

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 18



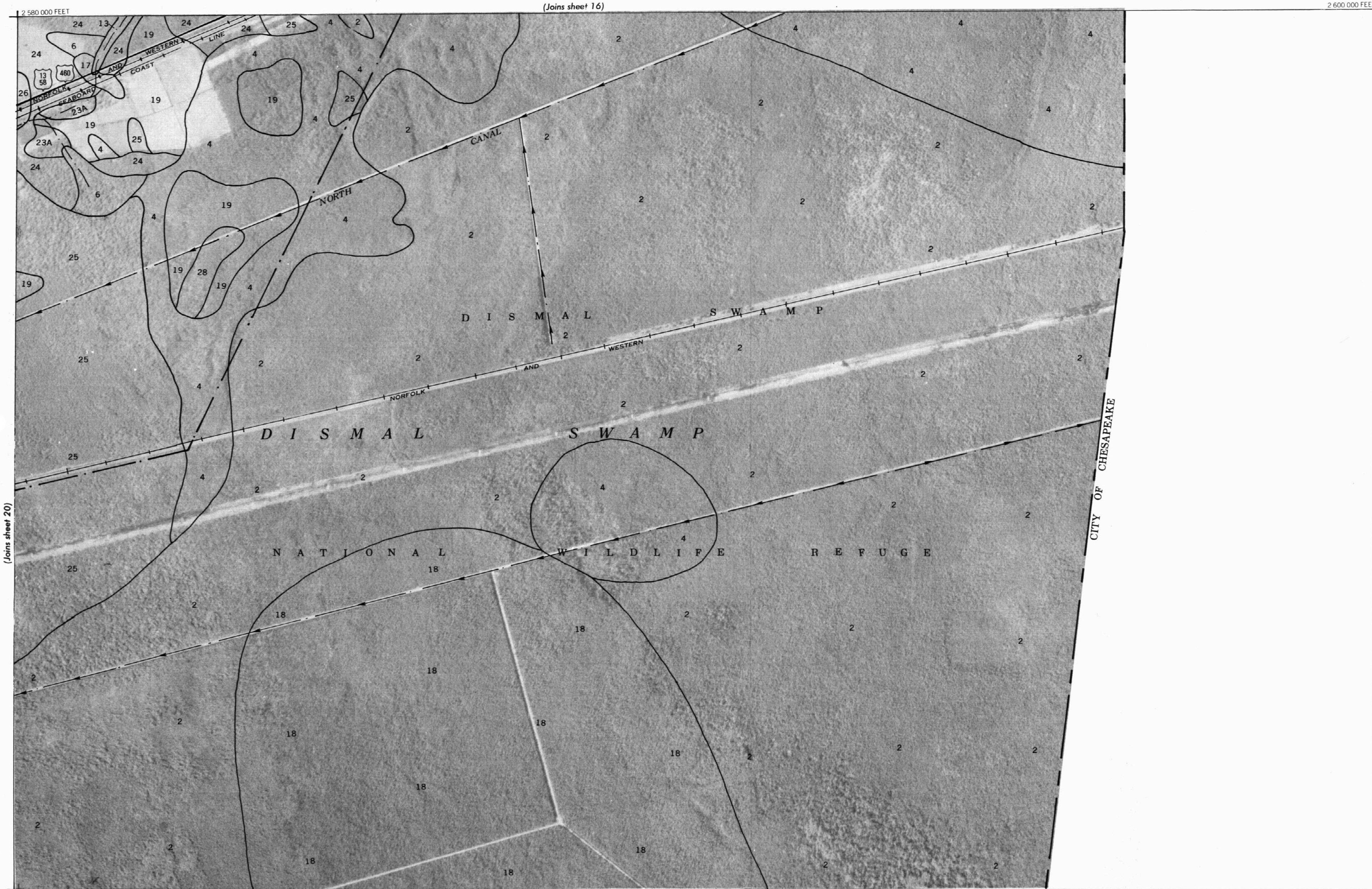
CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 19

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 20

(Joins sheet 16)

(Joins sheet 20)



(Joins sheet 27)

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

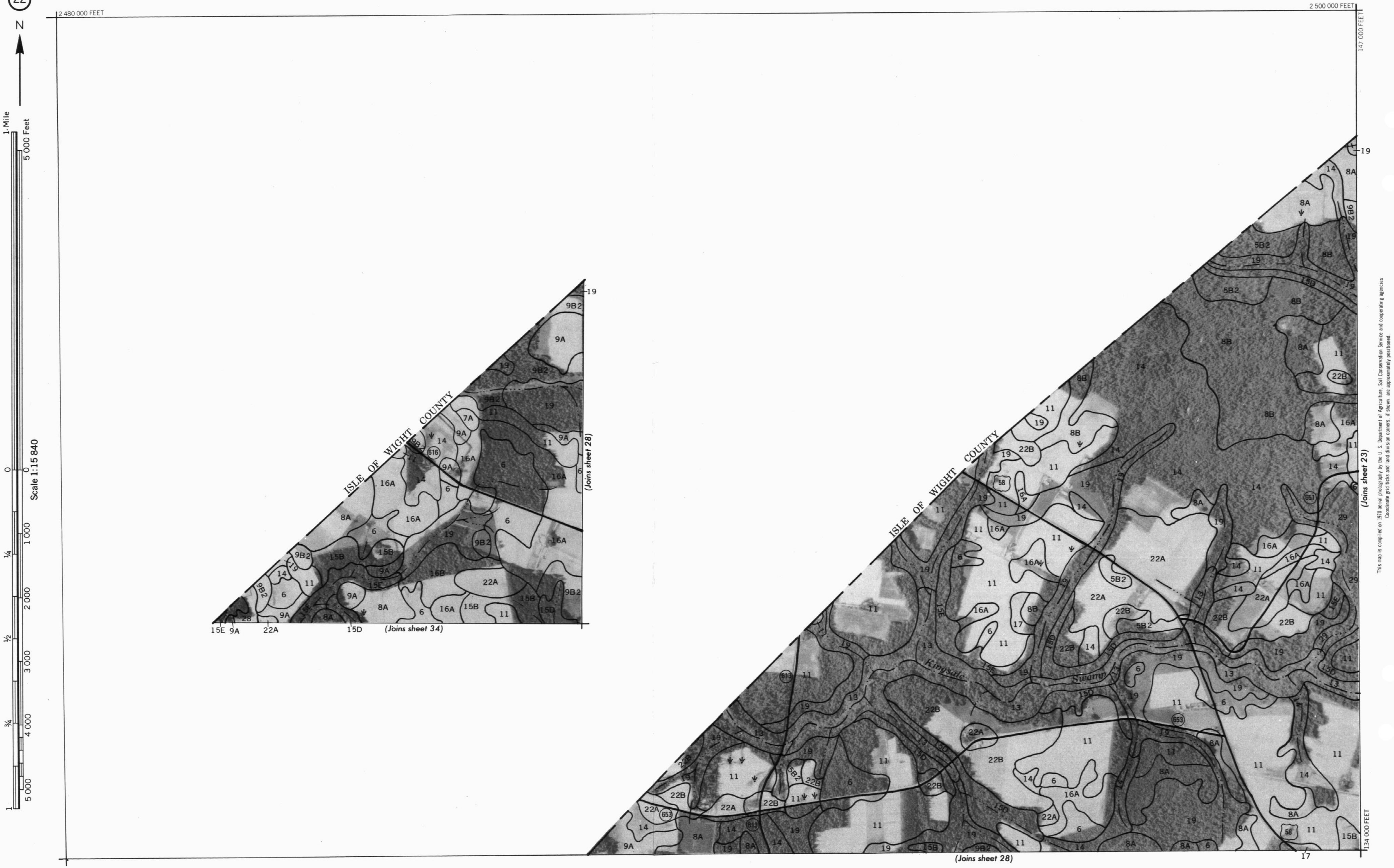
1 Mile — 5 000 Feet

0 — ¼ — ½ — ¾ — 1

0 — 1000 — 2000 — 3000 — 4000 — 5000

Scale 1:15 840

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 22



CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 23

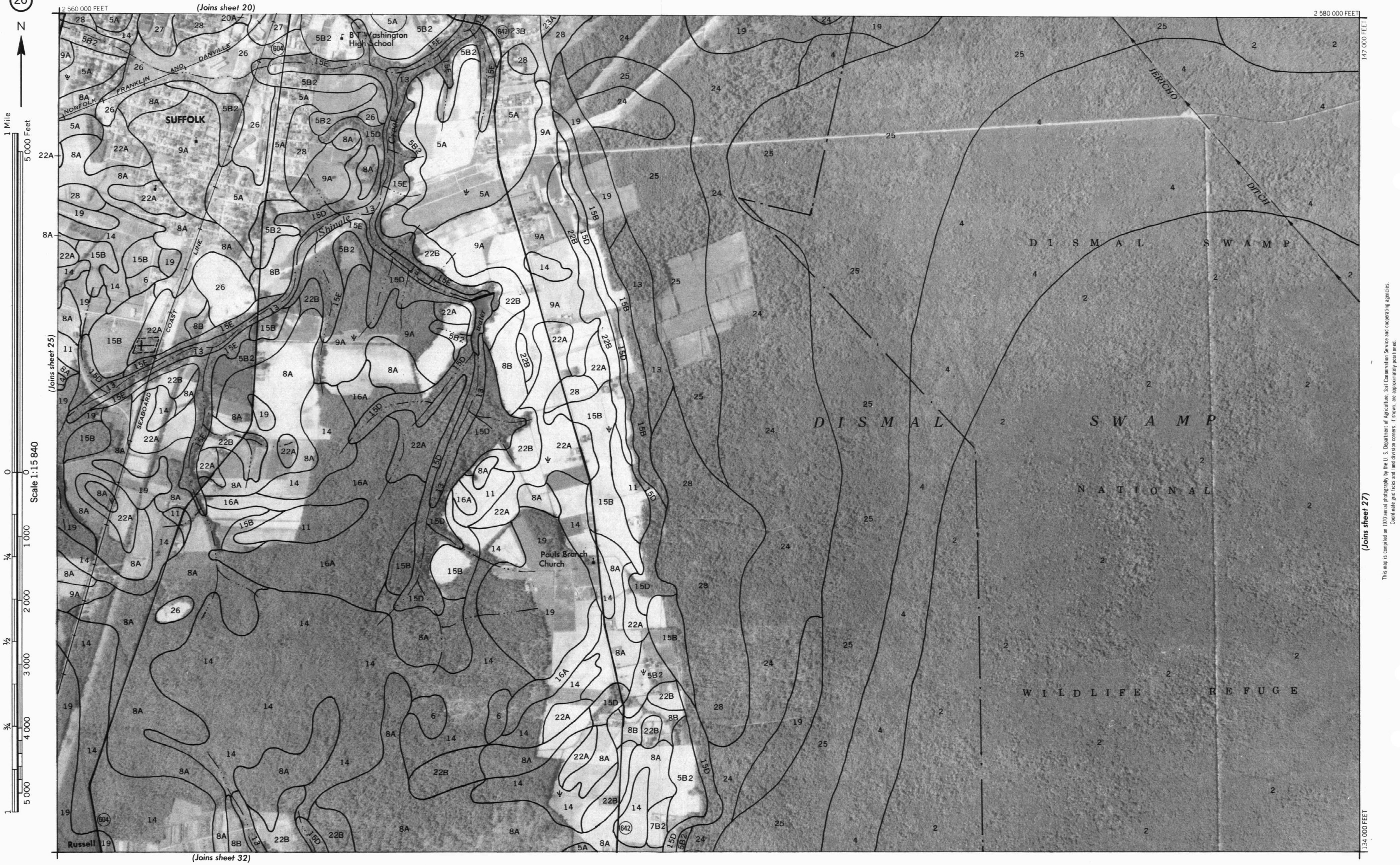
This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

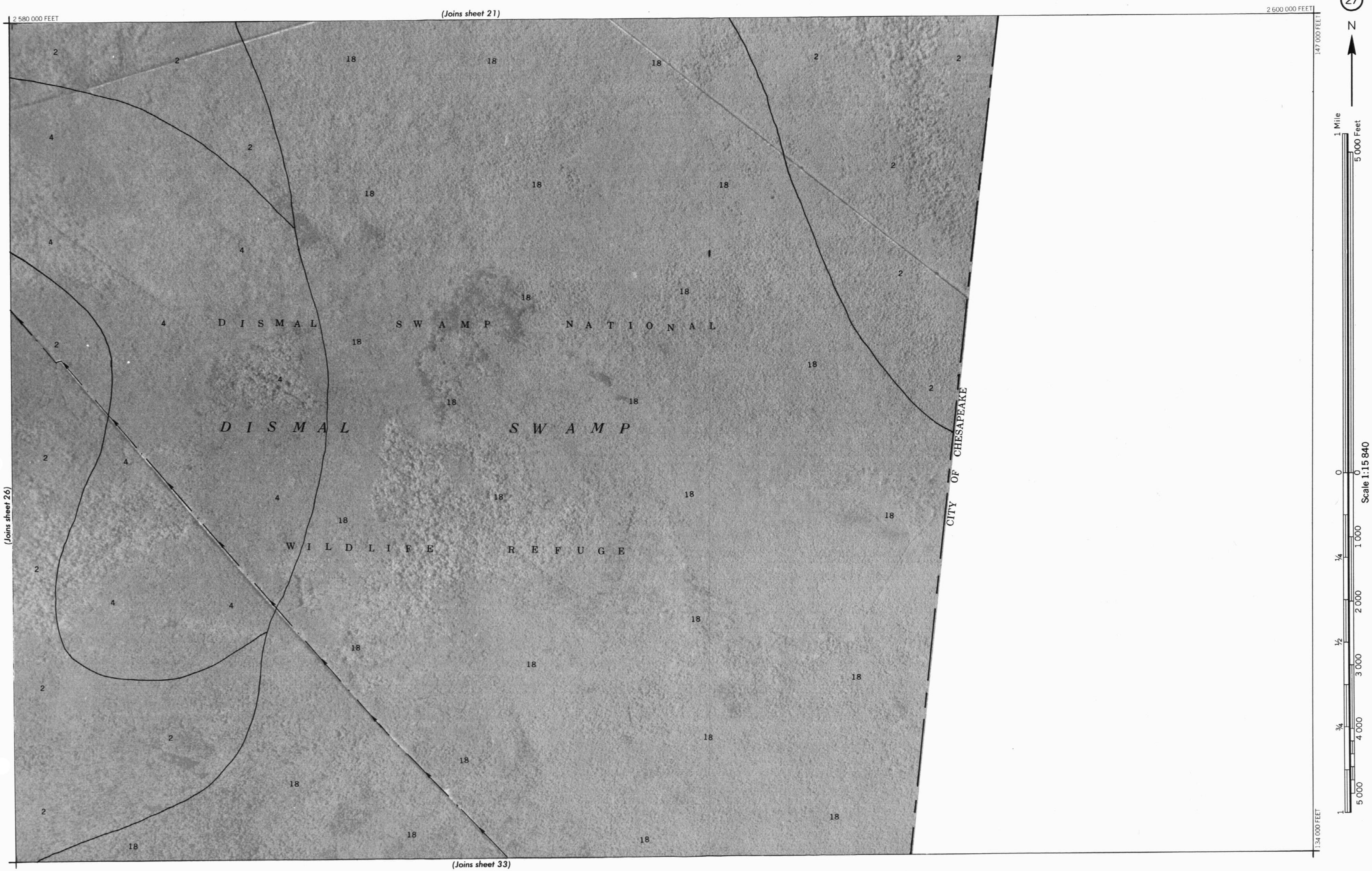
CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 24

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 26





This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 28

15B (Joins sheet 22)

2 480 000 FEET

2 500 000 FEET

134 000 FEET

121 000 FEET

(Joins inset, sheet 22)

(Joins sheet 29)

(Joins sheet 35)

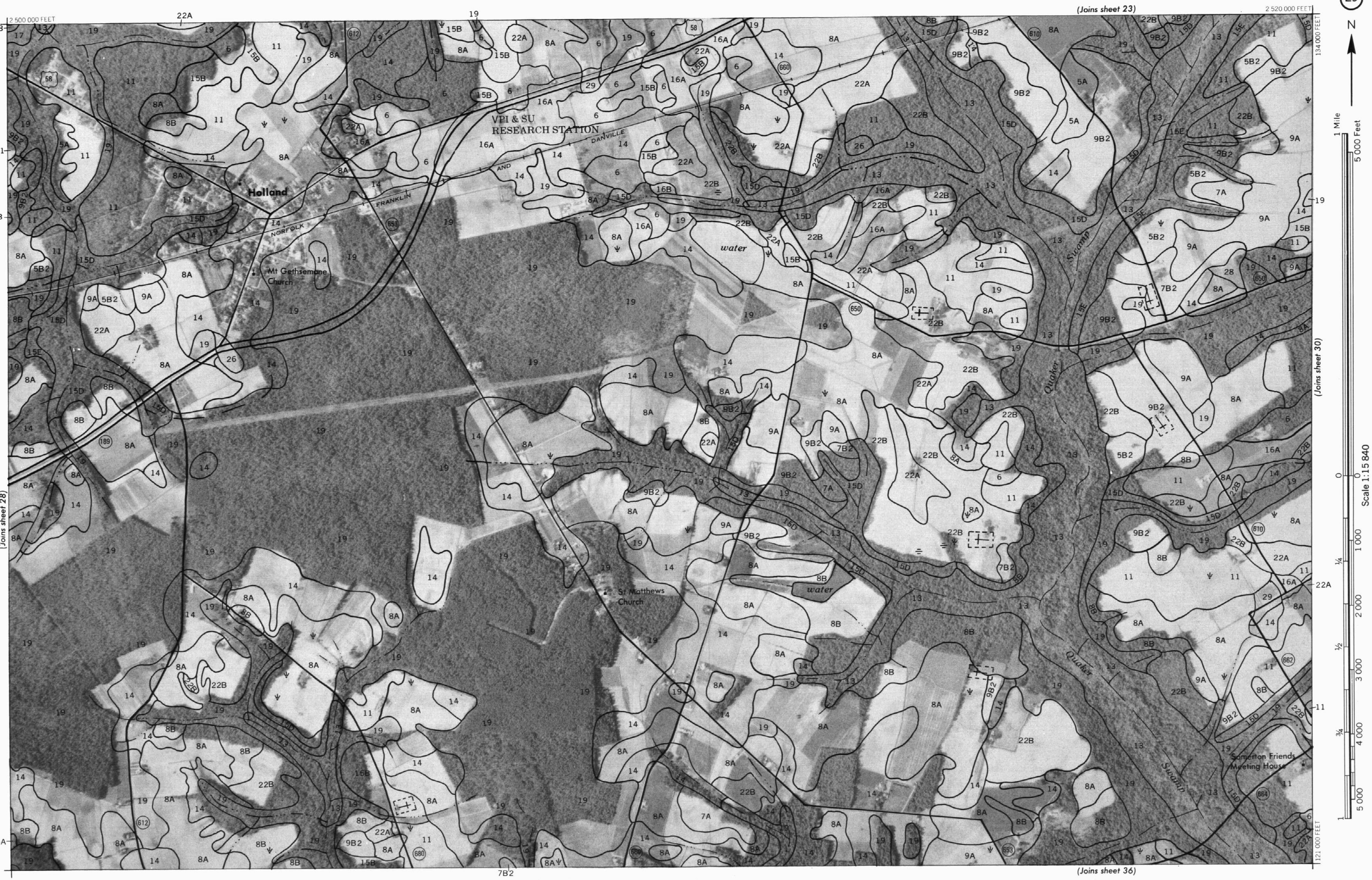
N

Scale 1:15 840

1 Mile

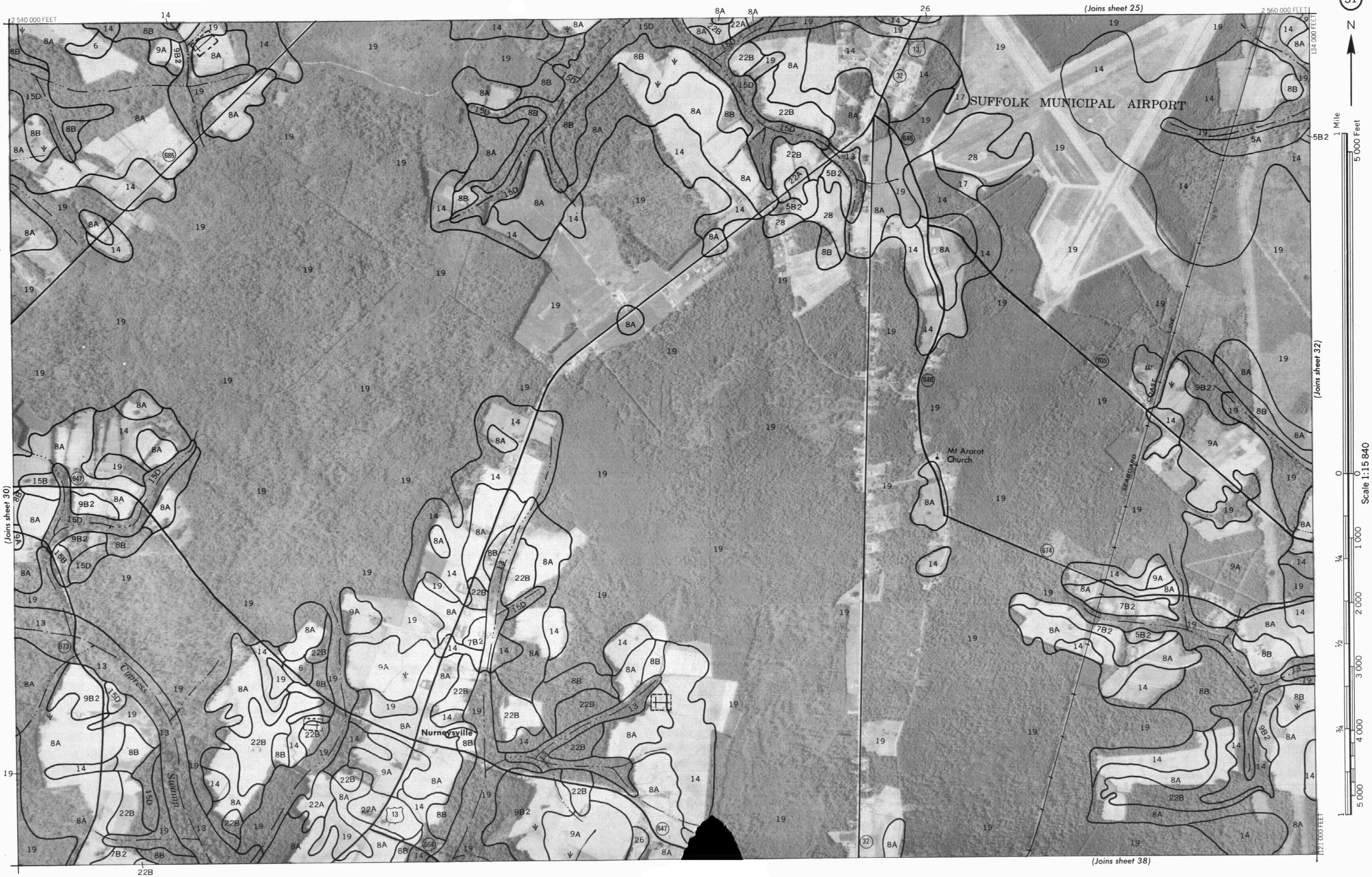
5 000 Feet

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

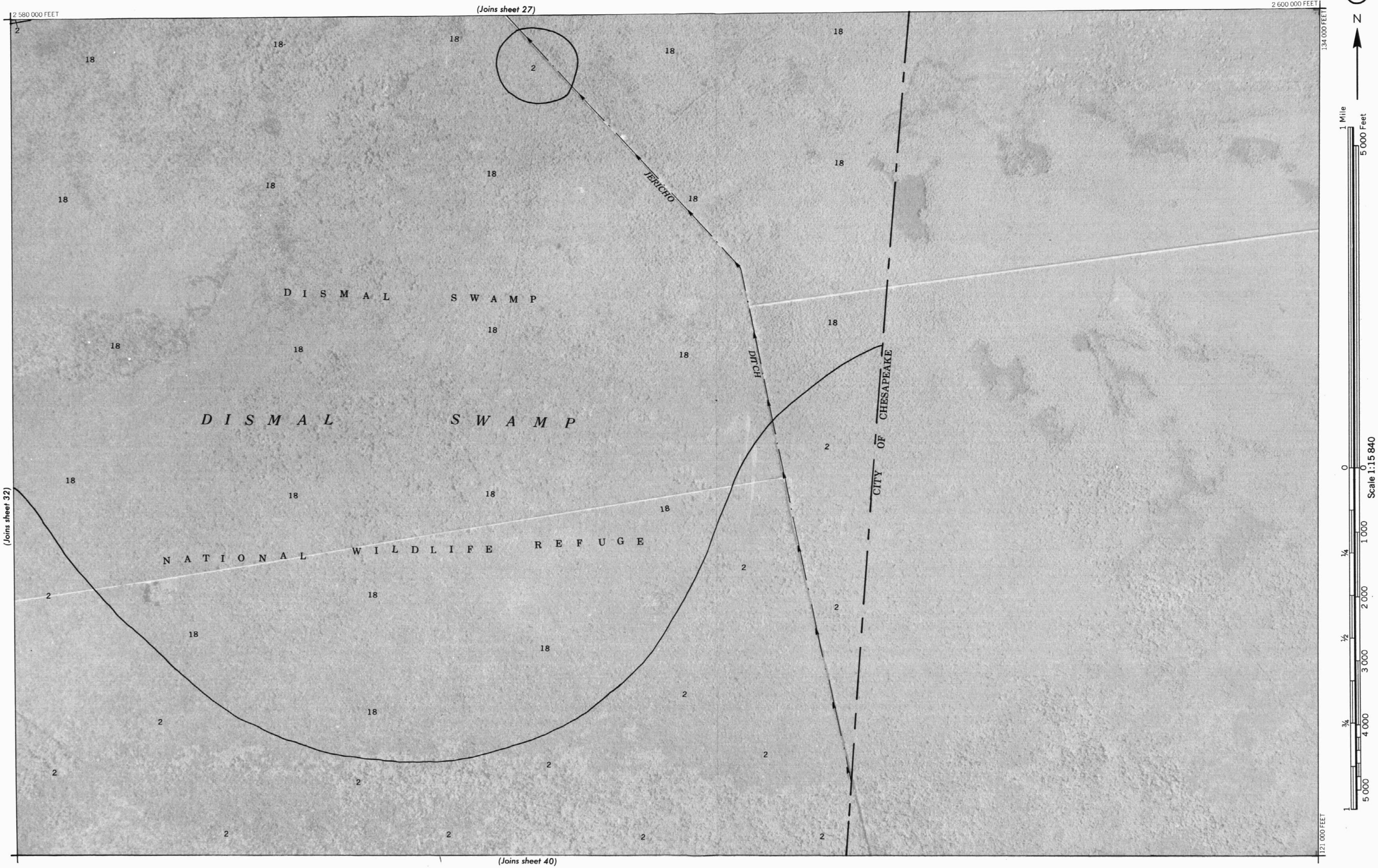

(Joins sheet 24)
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 37)
2 520 000 FEET
2 540 000 FEET
134 000 FEET
121 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840
Savage Crossing School
Bakers Crossing
Gethsemane Church
Zion Church
This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

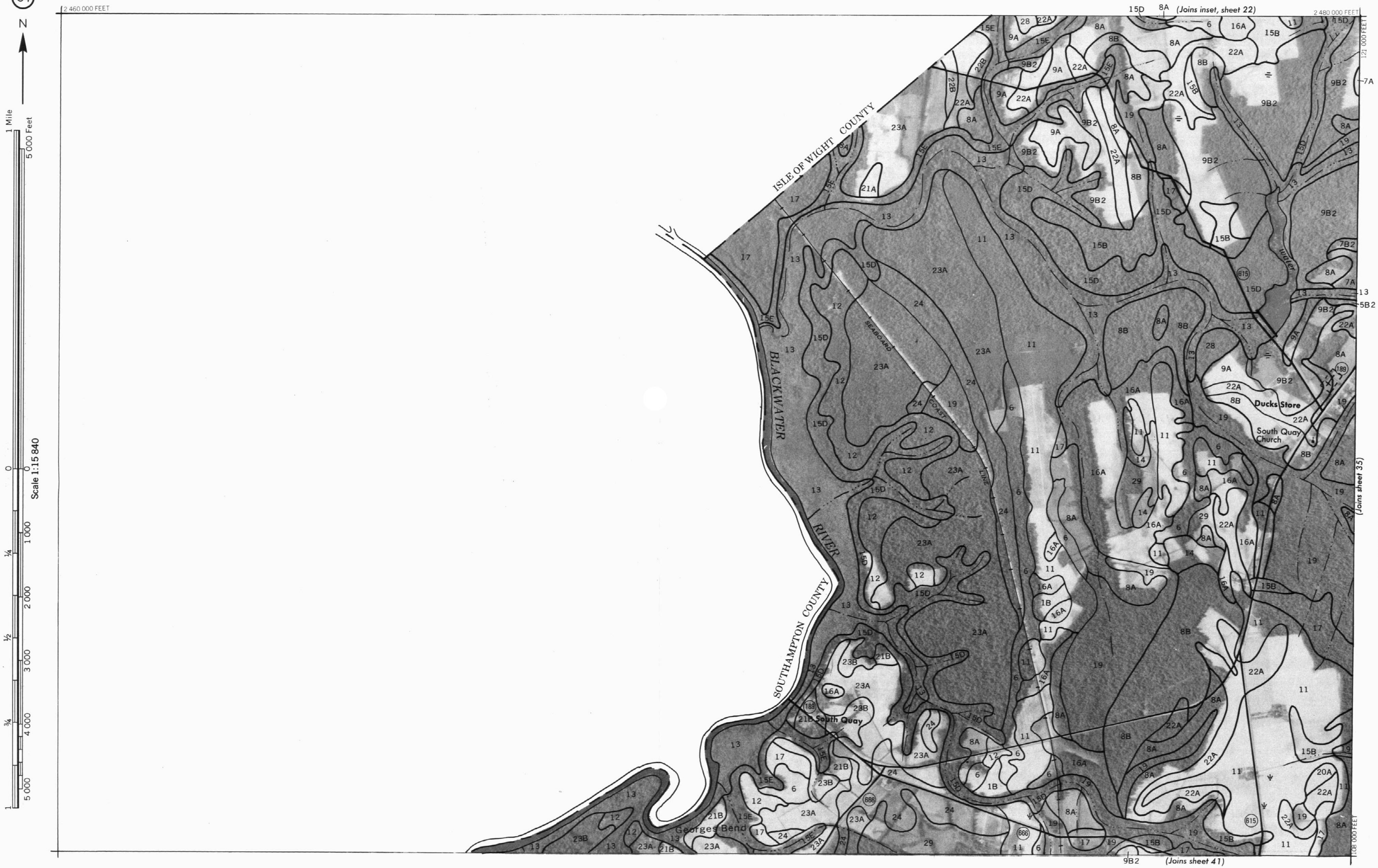
CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 32

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

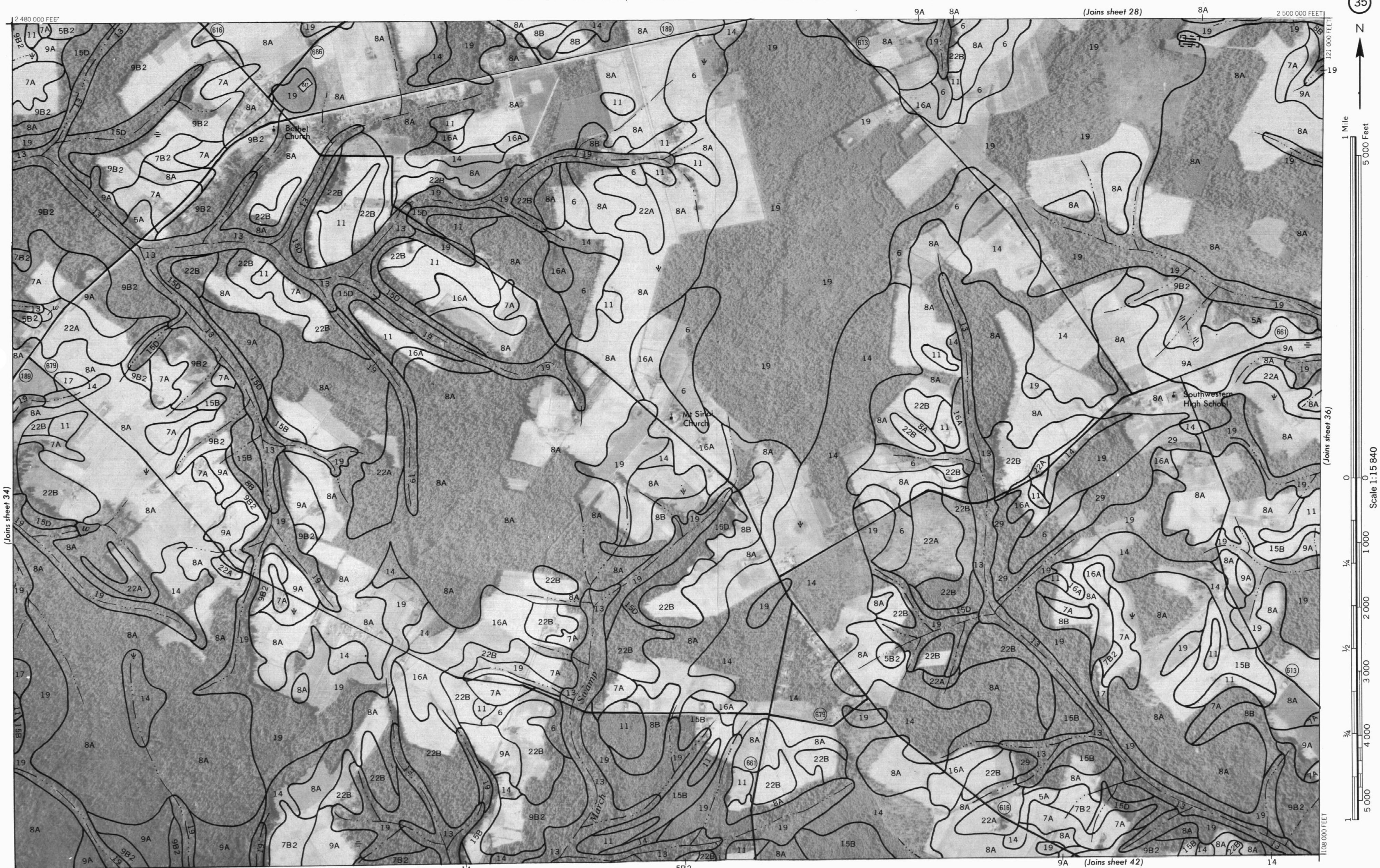


This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 34



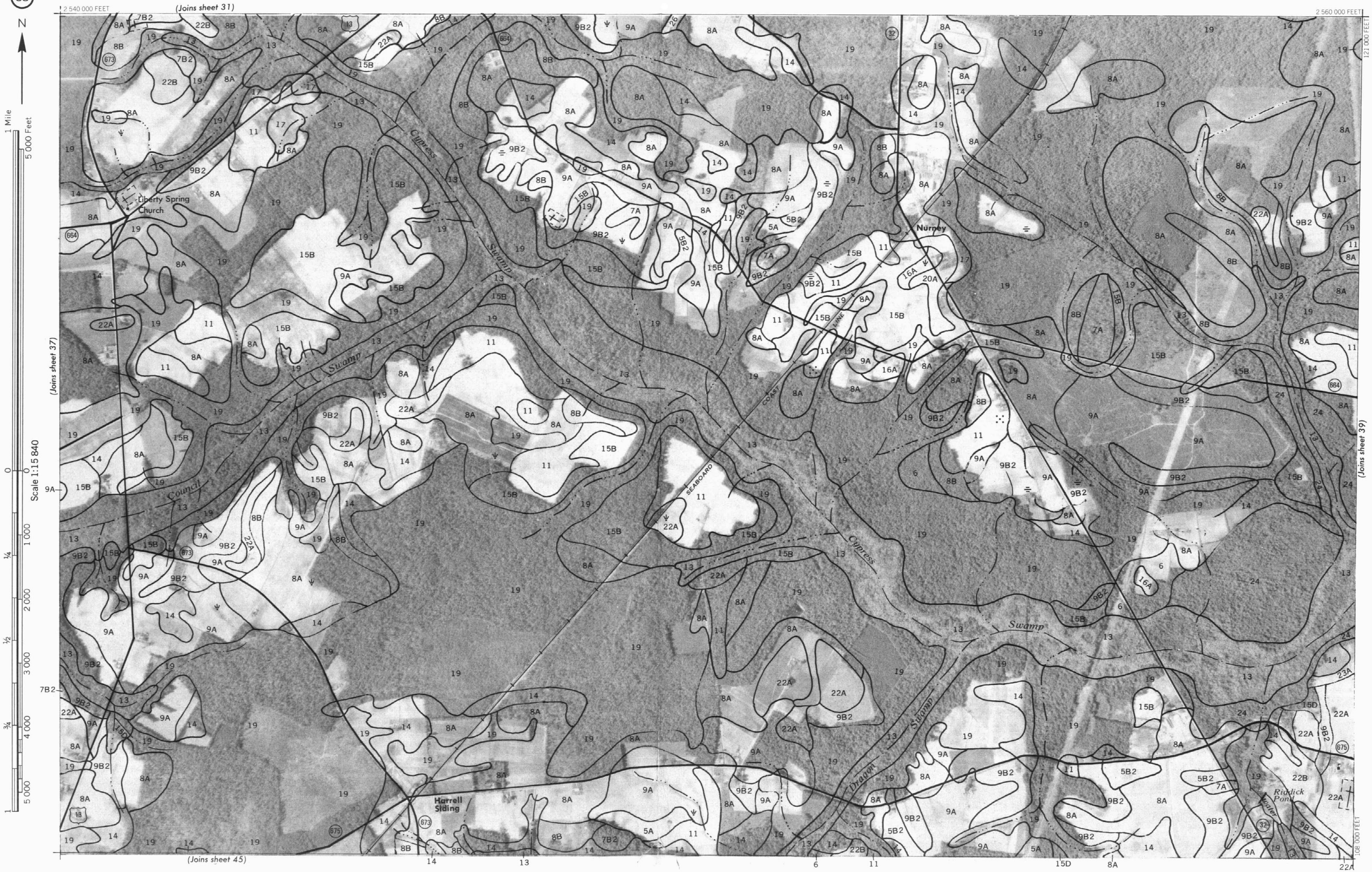
This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

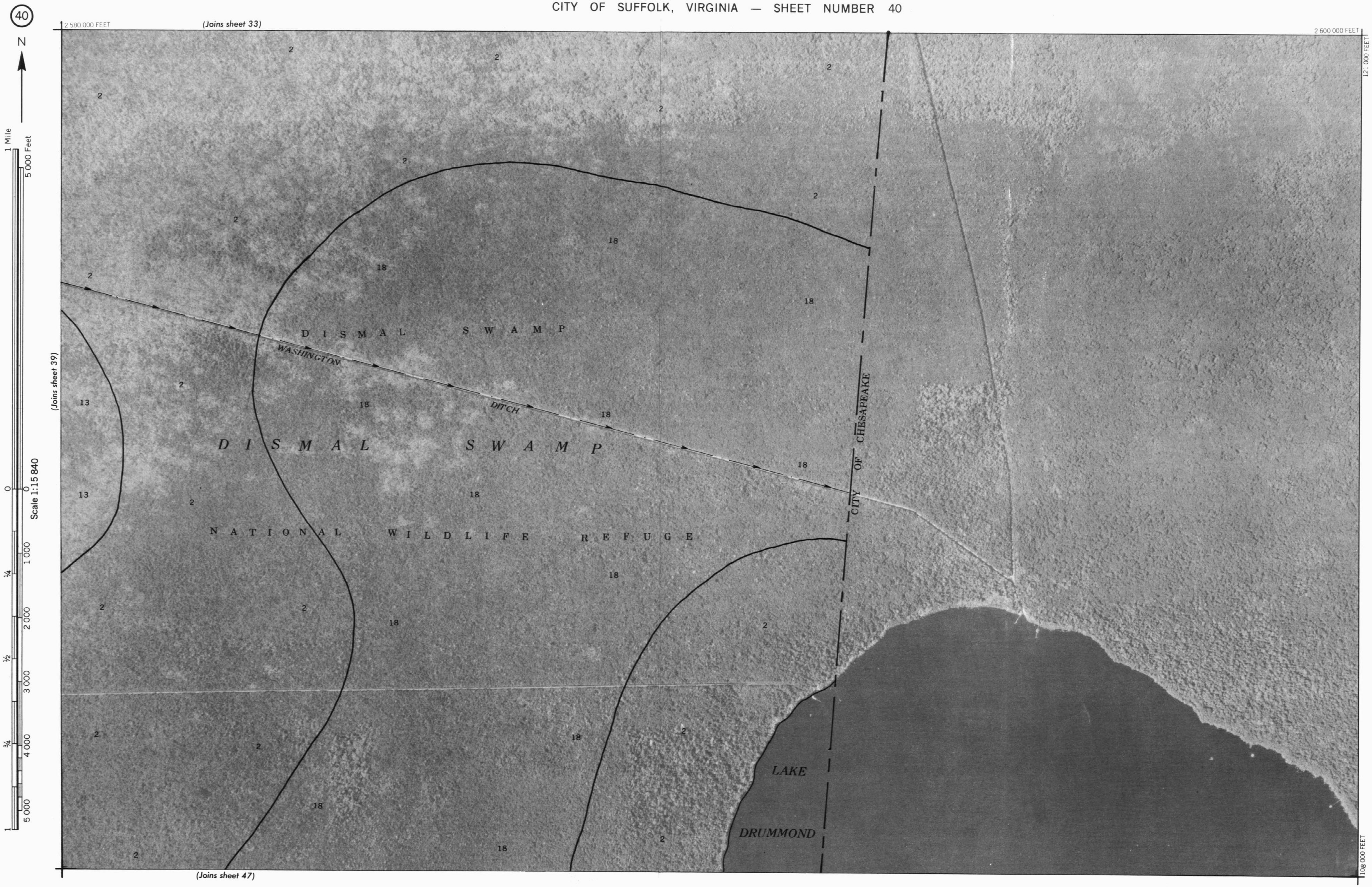
CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 36

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

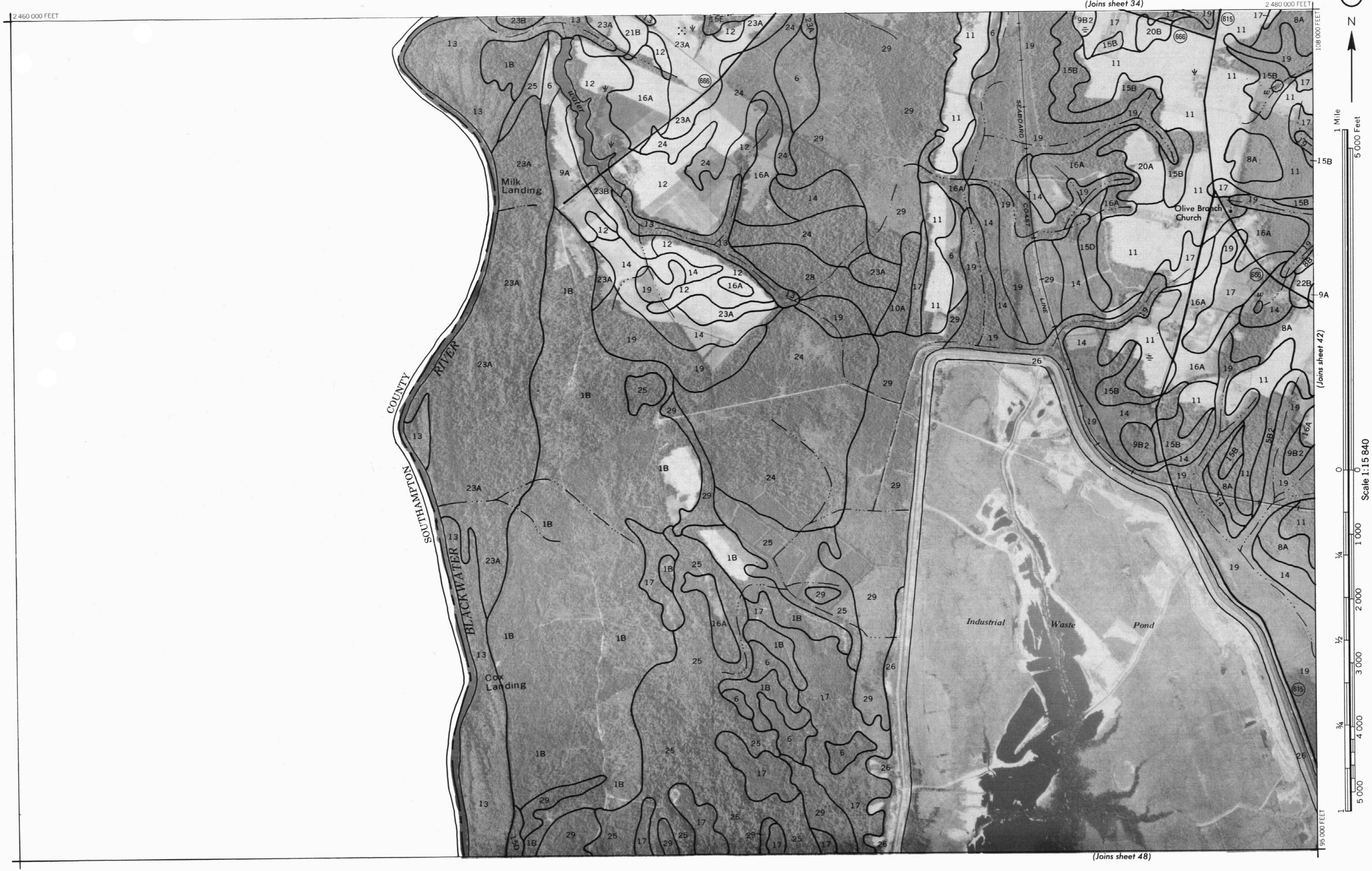

38
N
(Joins sheet 31)
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 45)
2 540 000 FEET
2 560 000 FEET
121 000 FEET
108 000 FEET
Scale 1:15 840
1 Mile
5 000 Feet
Liberty Spring Church
Nurney
Harrell Siding
Riddick Pond
Cypress Swamp
Council Swamp
Dragon Swamp
SEABOARD
COAST LINE
This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 40

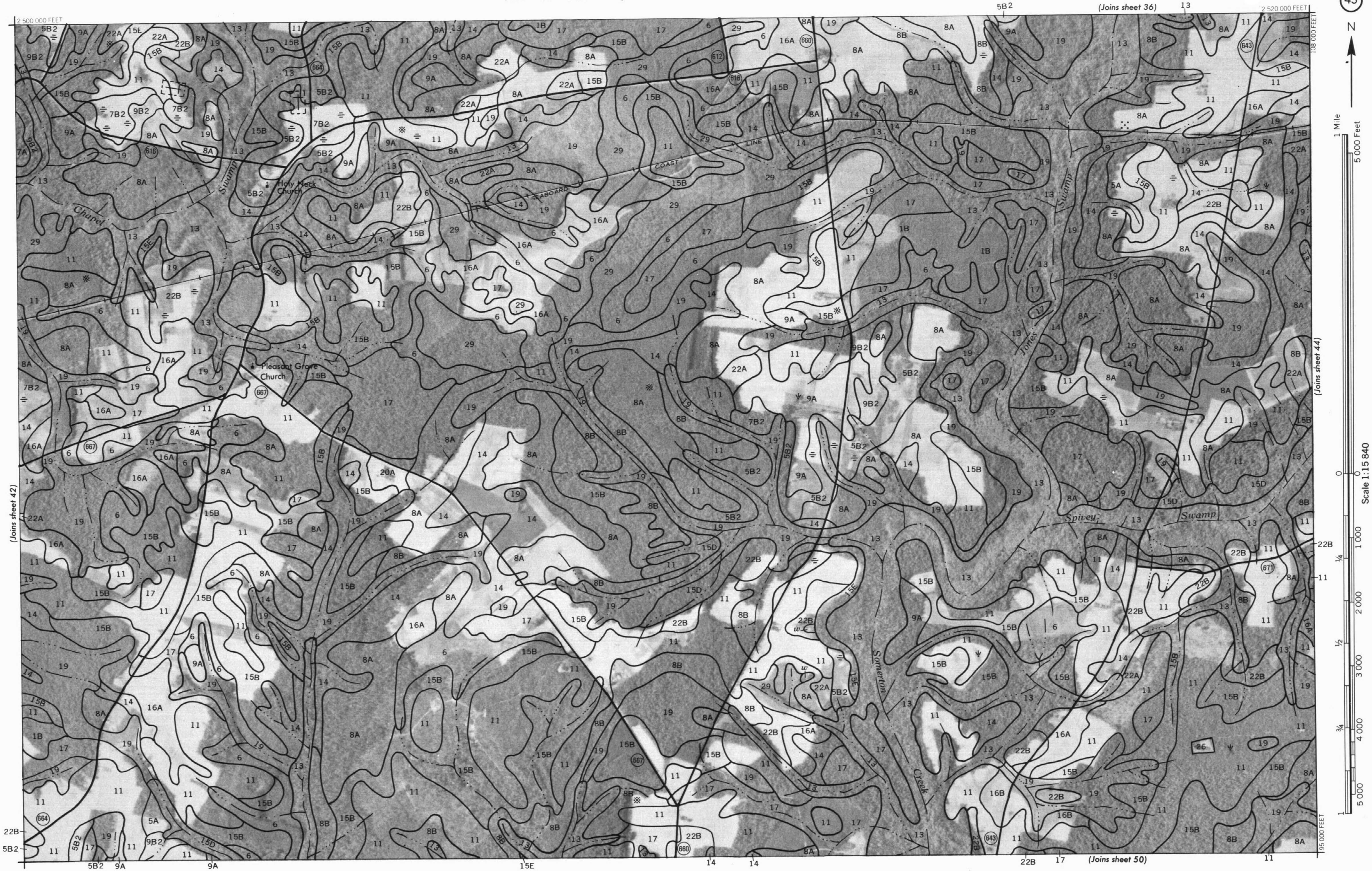


This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 42



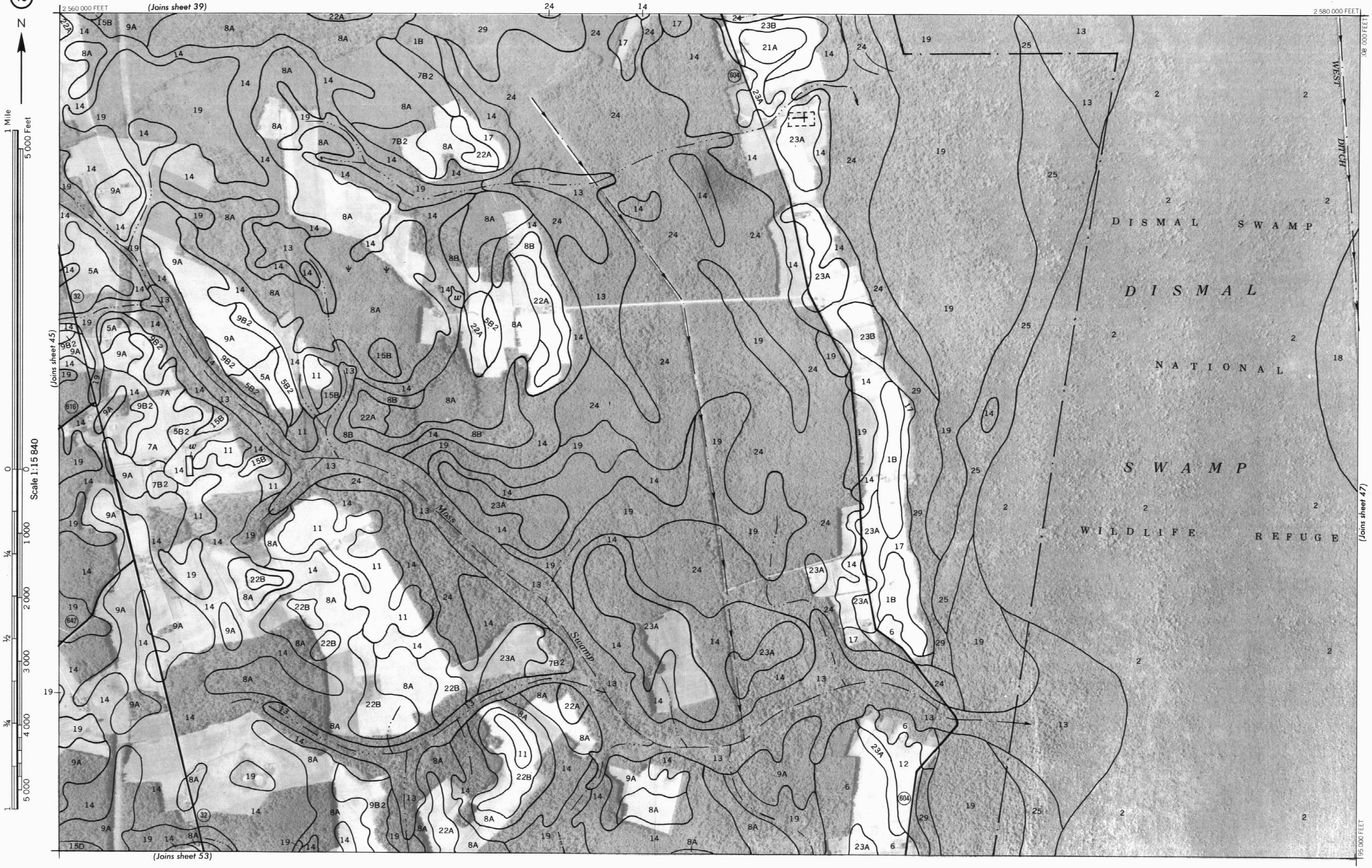
This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 44

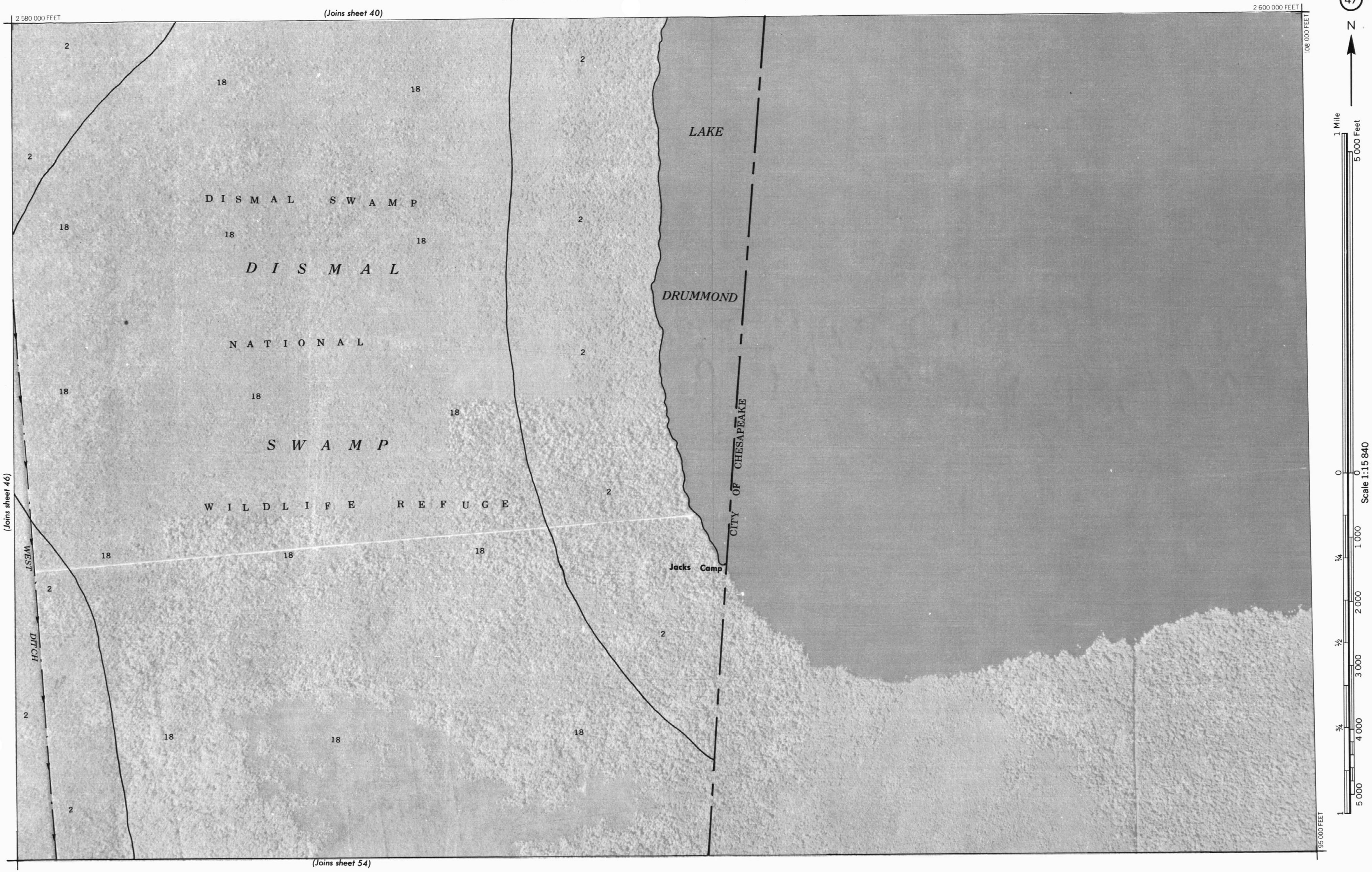
This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 46

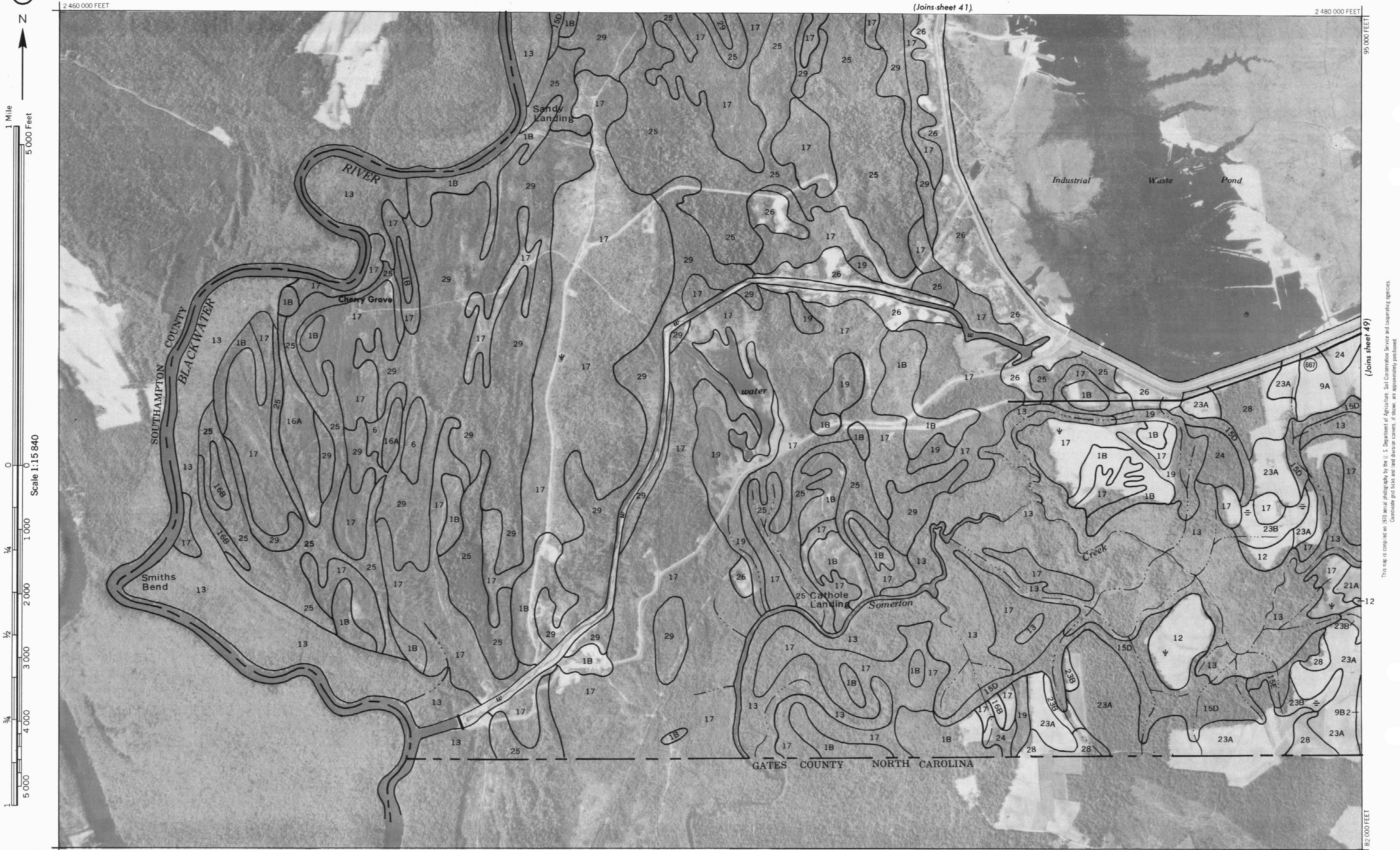


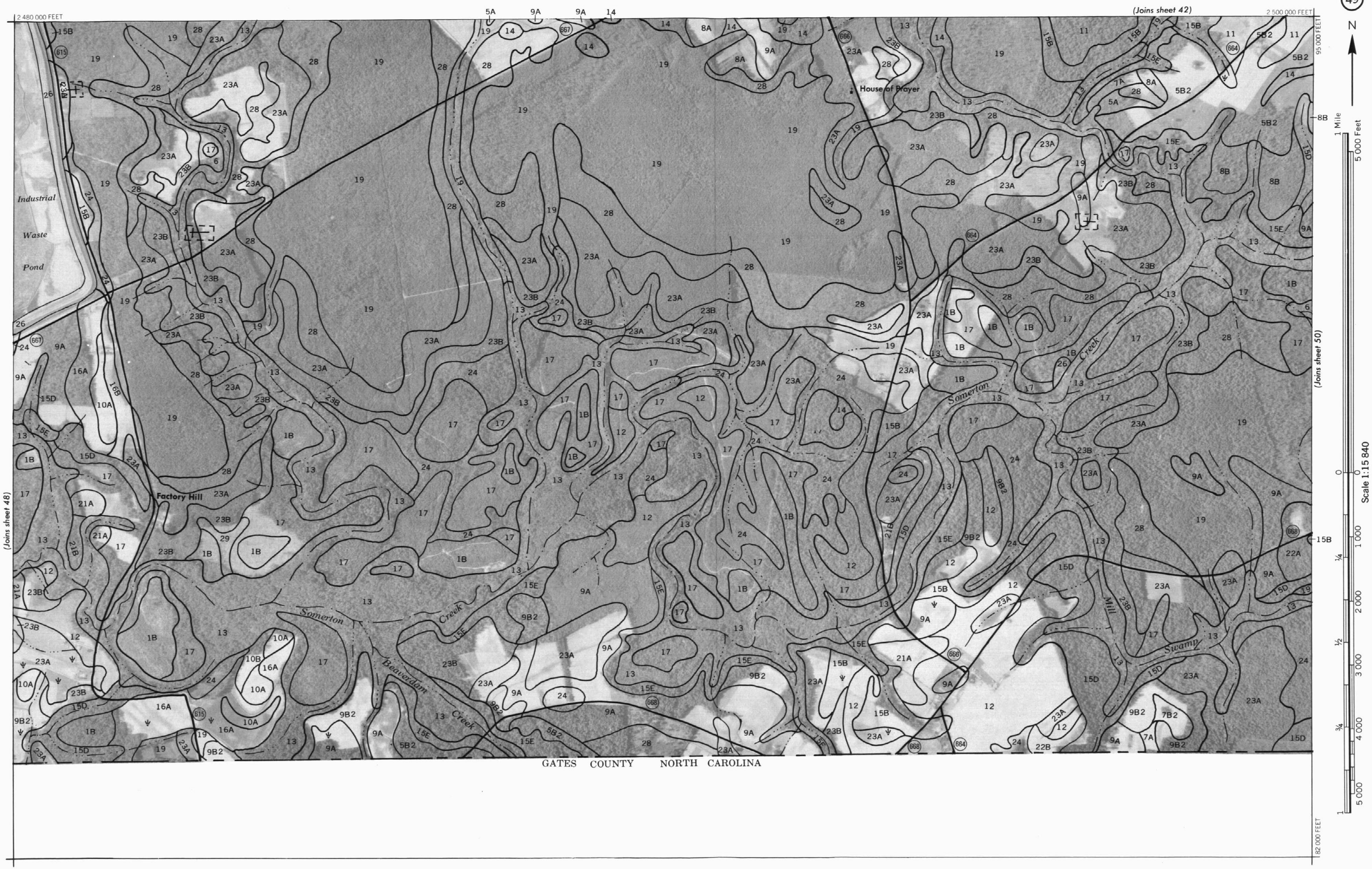
This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 48

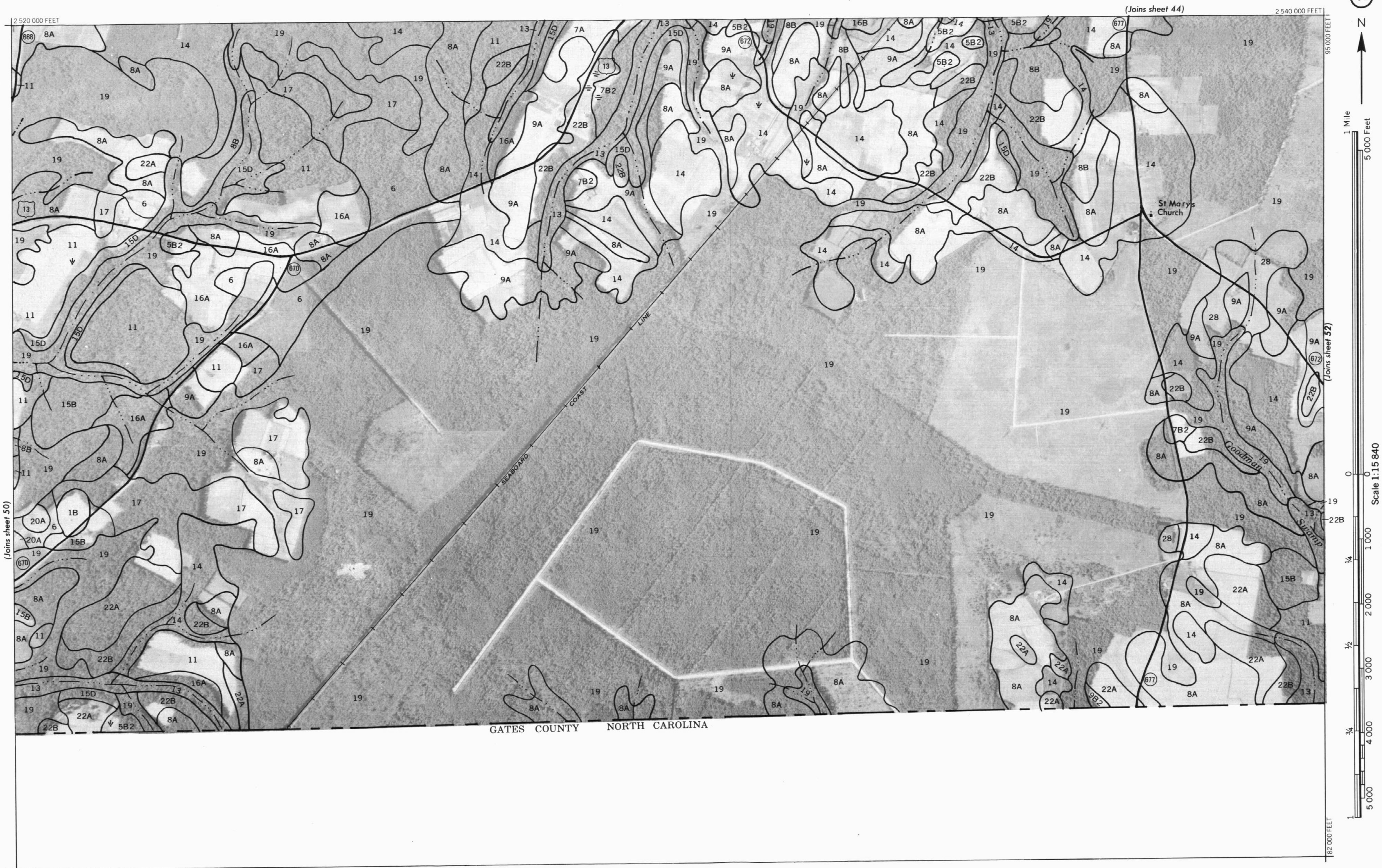




This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 50

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

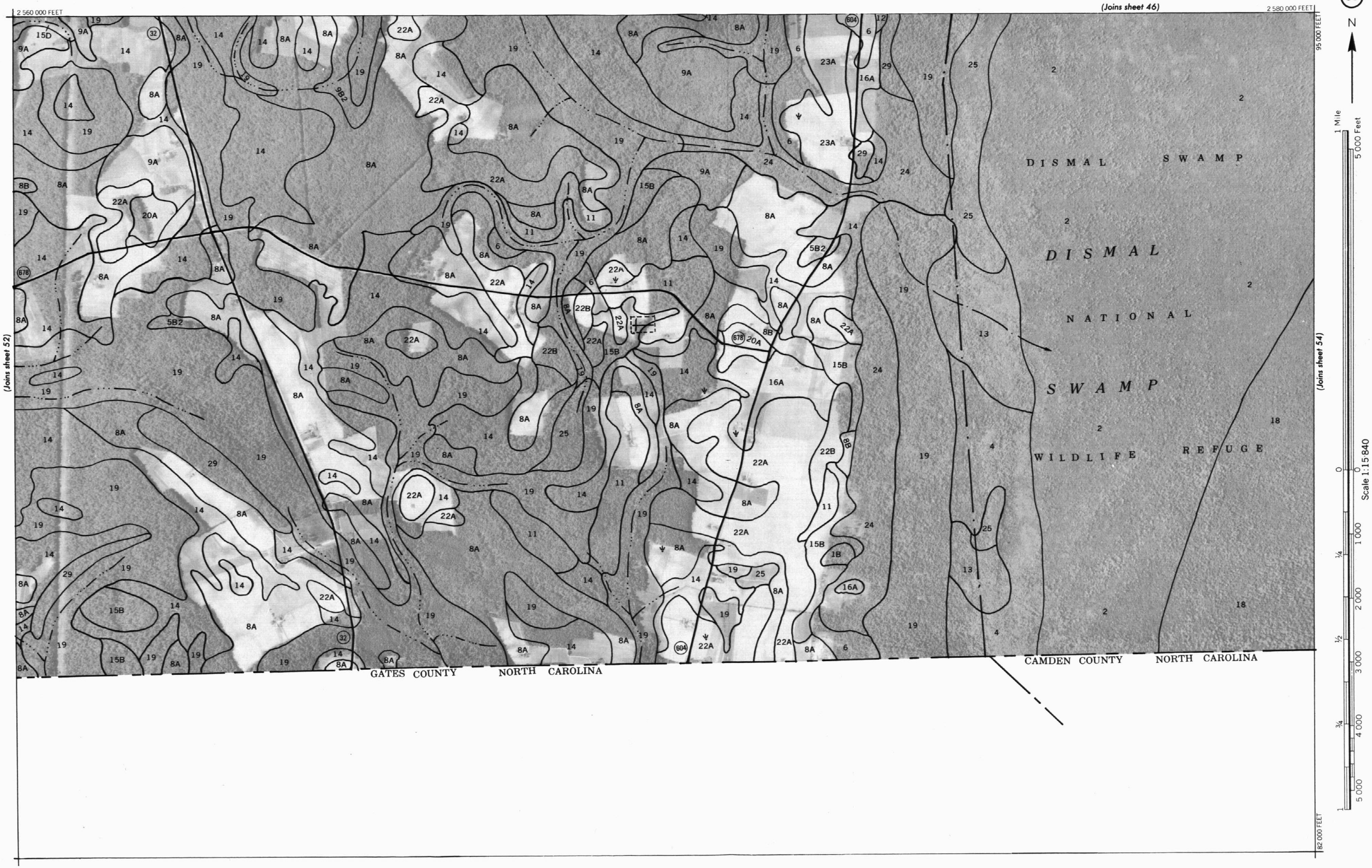
52

CITY OF SUFFOLK, VIRGINIA — SHEET NUMBER 52

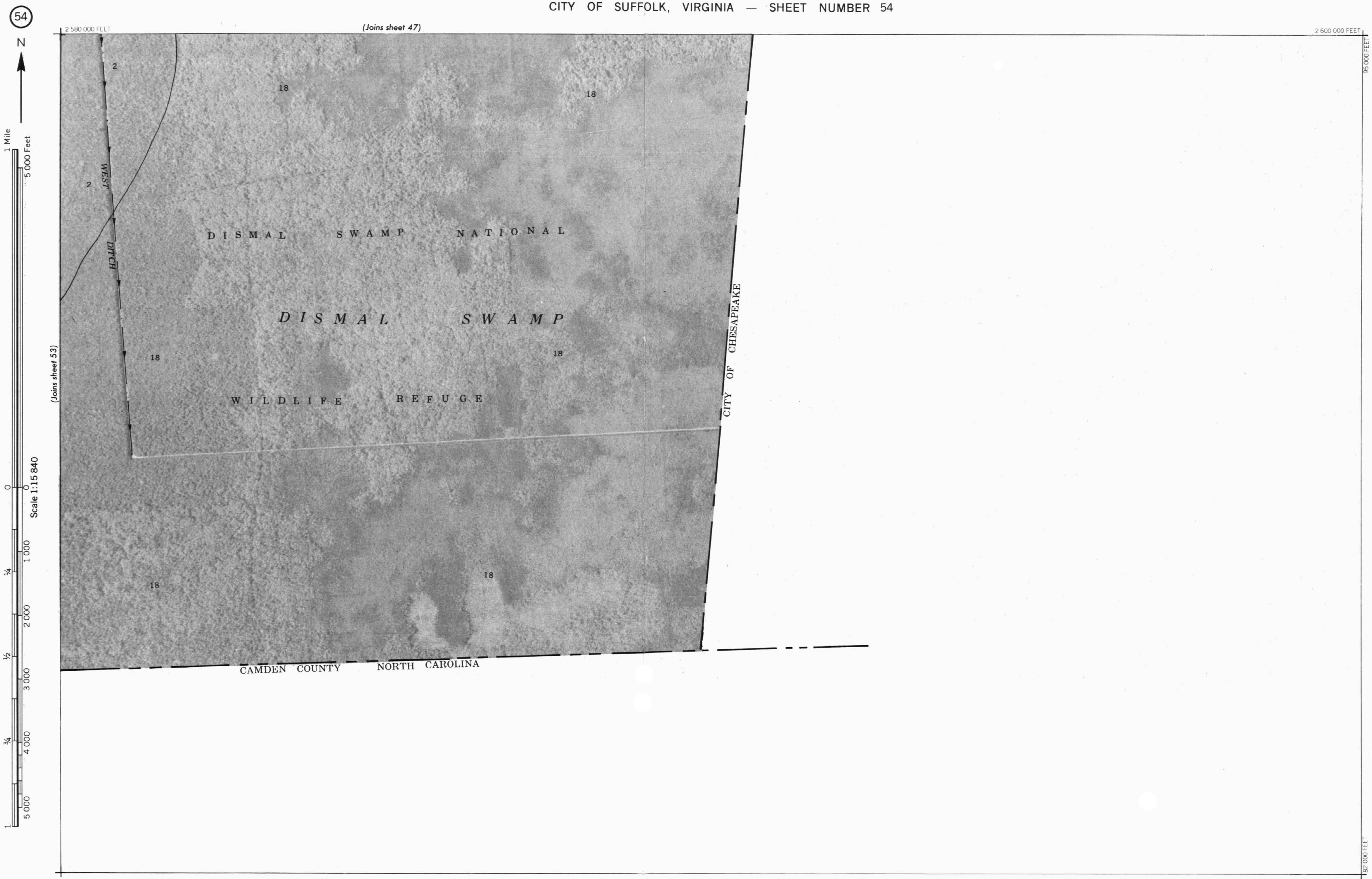
N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1970 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

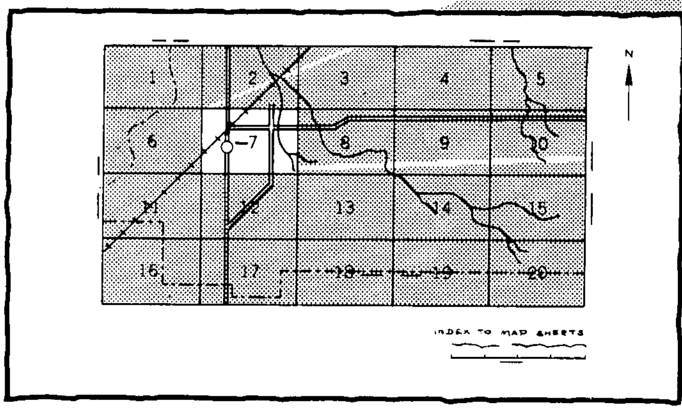
Soil survey of

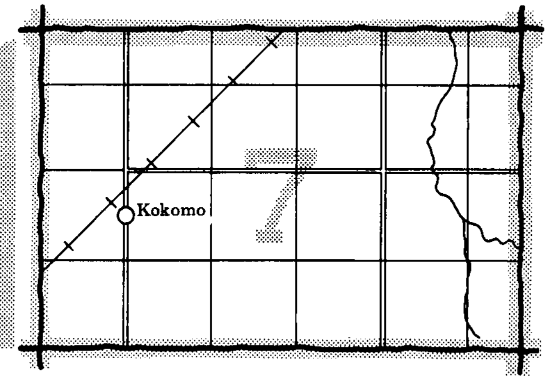
City of Suffolk VIRGINIA

United States Department of Agriculture
Soil Conservation Service
in cooperation with
Virginia Polytechnic Institute and State University

HOW TO USE

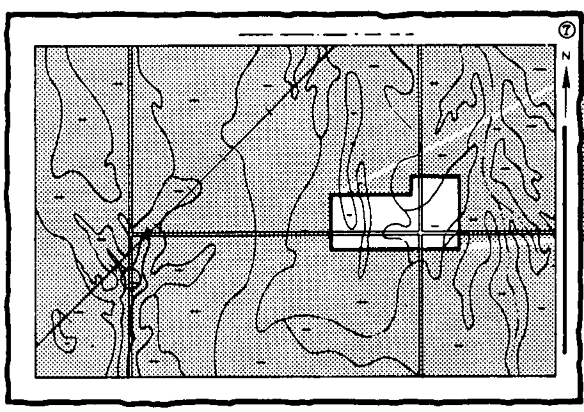
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

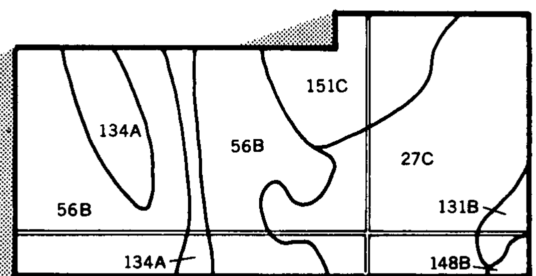




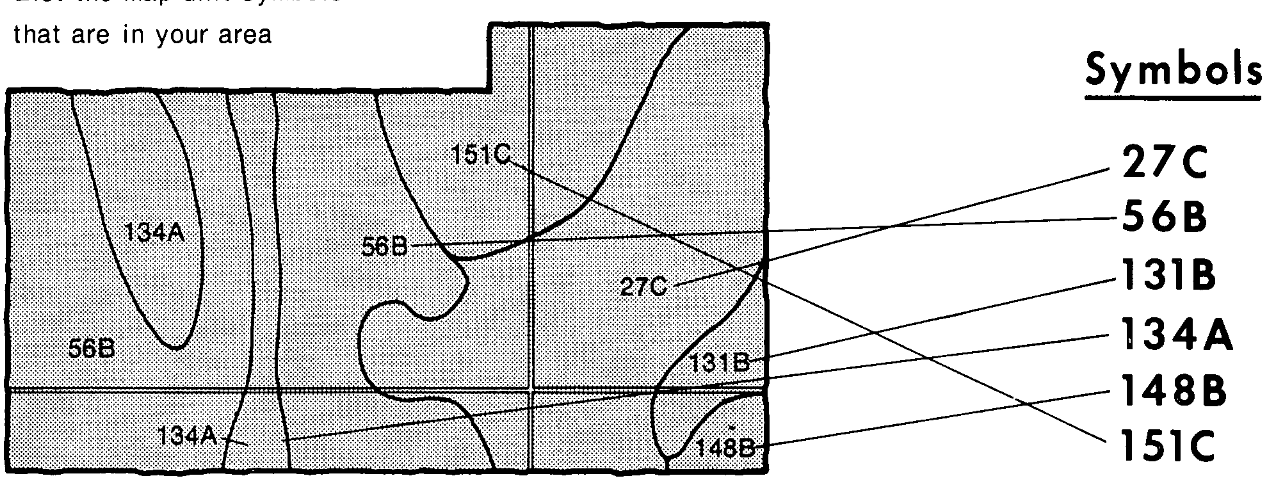
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



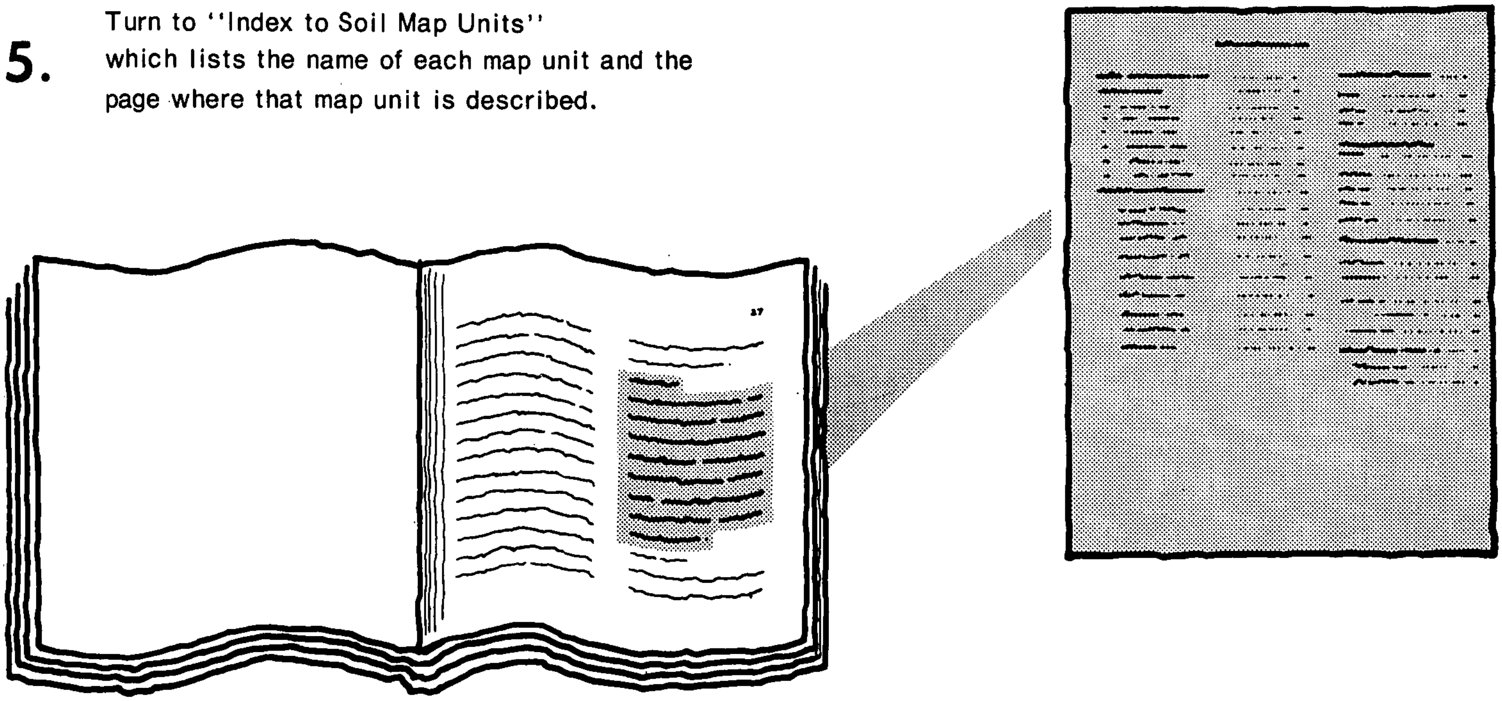


4. List the map unit symbols that are in your area

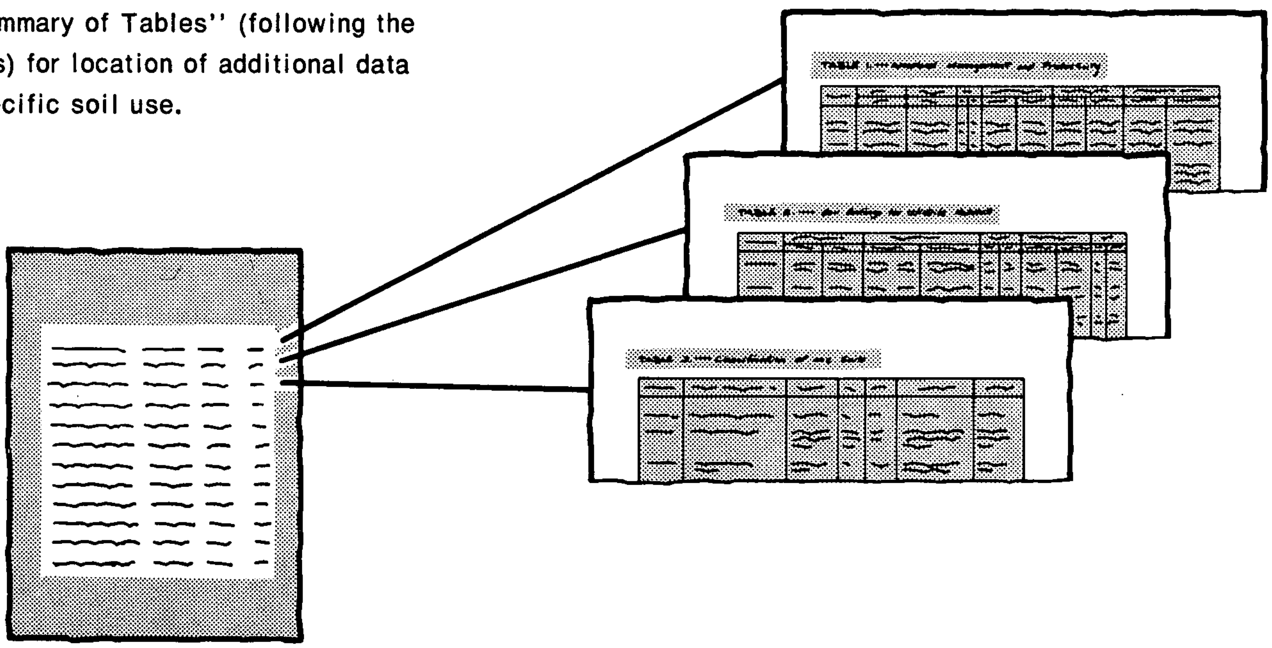


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1969-77. Soil names and descriptions were approved in 1979. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1978. This survey was made cooperatively by the Soil Conservation Service, the Virginia Polytechnic Institute and State University, and the City of Suffolk. The survey is part of the technical assistance furnished to the Peanut Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

contents

Index to map units iv
Summary of tables v
Foreword vii
General nature of the survey area 1
Climate 1
History 2
Agriculture and industry 2
Physiography, relief, and drainage 2
How this survey was made 2
General soil map units 3
1. Eunola-Kenansville-Suffolk association 3
2. Goldsboro-Dogue-Emporia association 3
3. Tetotum-State-Nansemond association 4
4. Nansemond-Kalmia association 4
5. Pactolus-Torhunta-Alaga association 4
6. Rains-Lynchburg association 5
7. Tomotley-Weston-Dragston association 5
8. Levy-Rains-Lynchburg association 5
9. Torhunta-Deloss association 6
10. Pungo-Belhaven association 6
11. Bohicket association 6
Detailed soil map units 7
Soil descriptions 7
Prime farmland 28
Use and management of the soils 31
Crops and pasture 31
Yields per acre 31
Land capability classification 32
Woodland management and productivity 32
Recreation 33
Wildlife habitat 34
Engineering 35
Building site development 35
Sanitary facilities 36
Construction materials 37
Water management 38
Soil properties 39
Engineering index properties 39
Physical and chemical properties 40
Soil and water features 40
Classification of the soils 43
Soil series and their morphology 43
Formation of the soils 57
Factors of soil formation 57
Parent material 57
Relief 58
Climate 58
Living organisms 58
Time 58
Processes of soil formation 58
References 61
Glossary 63
Tables 69

soil series

Alaga series 43
Belhaven series 44
Bohicket series 44
Deloss series 45
Dogue series 45
Dragston series 46
Emporia series 46
Eunola series 47
Goldsboro series 48
Kalmia series 48
Kenansville series 49
Levy series 49
Lynchburg series 50
Nansemond series 50
Pactolus series 51
Pungo series 51
Rains series 52
Rumford series 53
State series 53
Suffolk series 54
Tetotum series 54
Tomotley series 55
Torhunta series 55
Udorthents 56
Urban land 56
Wahee series 56
Weston series 57

Issued June 1981

index to map units

1B—Alaga loamy sand, wet substratum, 2 to 8 percent slopes ... 7
2—Belhaven muck ... 8
3—Bohicket silty clay loam ... 8
4—Deloss mucky loam ... 8
5A—Dogue fine sandy loam, 0 to 2 percent slopes ... 9
5B2—Dogue fine sandy loam, 2 to 6 percent slopes, eroded ... 9
6—Dragston fine sandy loam ... 10
7A—Emporia fine sandy loam, 0 to 2 percent slopes 10
7B2—Emporia fine sandy loam, 2 to 6 percent slopes, eroded ... 11
8A—Eunola loamy fine sand, 0 to 2 percent slopes .. 11
8B—Eunola loamy fine sand, 2 to 6 percent slopes .. 12
9A—Goldsboro fine sandy loam, 0 to 2 percent slopes ... 13
9B2—Goldsboro fine sandy loam, 2 to 5 percent slopes, eroded ... 13
10A—Kalmia fine sandy loam, wet substratum, 0 to 2 percent slopes ... 14
10B—Kalmia fine sandy loam, wet substratum, 2 to 6 percent slopes ... 14
11—Kenansville loamy sand, 0 to 4 percent slopes .. 14
12—Kenansville loamy sand, wet substratum, 0 to 4 percent slopes ... 15
13—Levy silty clay loam ... 15
14—Lynchburg fine sandy loam ... 16
15B—Nansemond loamy fine sand, 0 to 6 percent slopes ... 17
15D—Nansemond loamy fine sand, 6 to 15 percent slopes ... 18
15E—Nansemond loamy fine sand, 15 to 30 percent slopes ... 18
16A—Nansemond fine sandy loam, 0 to 2 percent slopes ... 19
16B—Nansemond fine sandy loam, 2 to 6 percent slopes ... 19
17—Pactolus loamy fine sand ... 20
18—Pungo muck ... 20
19—Rains fine sandy loam ... 20
20A—Rumford loamy fine sand, 0 to 2 percent slopes ... 21
20B—Rumford loamy fine sand, 2 to 6 percent slopes ... 22
21A—State fine sandy loam, 0 to 2 percent slopes ... 23
21B—State fine sandy loam, 2 to 6 percent slopes ... 23
22A—Suffolk loamy sand, 0 to 2 percent slopes ... 24
22B—Suffolk loamy sand, 2 to 6 percent slopes ... 24
23A—Tetotum fine sandy loam, 0 to 2 percent slopes ... 24
23B—Tetotum fine sandy loam, 2 to 6 percent slopes ... 25
24—Tomotley loam ... 26
25—Torhunta loam ... 26
26—Udorthents, loamy ... 26
27—Urban land ... 27
28—Wahee silt loam ... 27
29—Weston fine sandy loam ... 27

summary of tables

Temperature and precipitation (table 1) 70

Freeze dates in spring and fall (table 2) 71
Probability. Temperature.

Growing season (table 3) 71
Probability. Daily minimum temperature.

Acreage and proportionate extent of the soils (table 4) 72
Acres. Percent.

Yields per acre of crops and pasture (table 5) 73
Corn. Soybeans. Tobacco. Wheat. Peanuts. Grass hay. Pasture.

Woodland management and productivity (table 6) 75
Ordination symbol. Management concerns. Potential productivity. Trees to plant.

Recreational development (table 7) 77
Camp areas. Picnic areas. Playgrounds. Paths and trails. Golf fairways.

Wildlife habitat (table 8) 80
Potential for habitat elements. Potential as habitat for—Openland wildlife, Woodland wildlife, Wetland wildlife.

Building site development (table 9) 82
Shallow excavations. Dwellings without basements. Dwellings with basements. Small commercial buildings. Local roads and streets. Lawns and landscaping.

Sanitary facilities (table 10) 85
Septic tank absorption fields. Sewage lagoon areas. Trench sanitary landfill. Area sanitary landfill. Daily cover for landfill.

Construction materials (table 11) 87
Roadfill. Sand. Gravel. Topsoil.

Water management (table 12) 89
Limitations for—Pond reservoir areas; Embankments, dikes, and levees; Aquifer-fed excavated ponds. Features affecting—Drainage, Terraces and diversions, Grassed waterways.

Engineering index properties (table 13) 92
Depth. USDA texture. Classification—Unified, AASHTO. Fragments greater than 3 inches. Percentage passing sieve—4, 10, 40, 200. Liquid limit. Plasticity index.

Physical and chemical properties of the soils (table 14) 95
Depth. Clay. Moist bulk density. Permeability. Available water capacity. Reaction. Shrink-swell potential. Erosion factors. Organic matter.

Soil and water features (table 15)... 97
Hydrologic group. Flooding. High water table. Bedrock. Risk of corrosion.

Classification of the soils (table 16).. 99
Family or higher taxonomic class.

foreword

This soil survey contains information that can be used in land-planning programs in the City of Suffolk. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

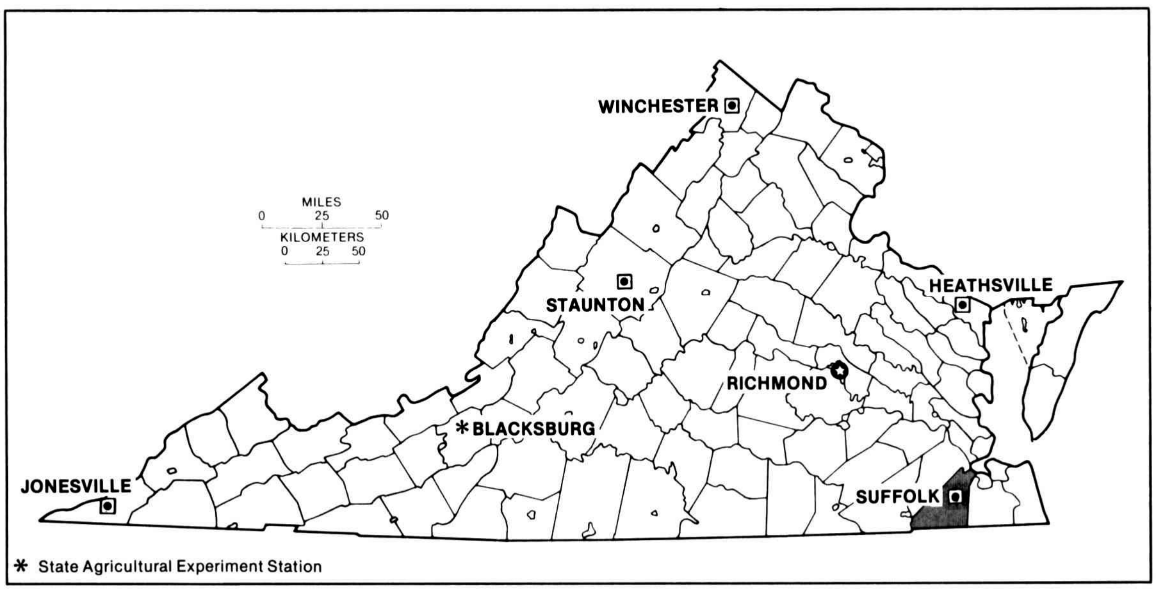
This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Manly S. Wilder

Manly S. Wilder
State Conservationist
Soil Conservation Service



Location of the City of Suffolk in Virginia.

soil survey of
City of Suffolk, Virginia

By Earl J. Reber, Moulton A. Bailey, Paul J. Swecker, and Jerry S. Quesenberry
of the Soil Conservation Service
and Donnie Bradshaw of the City of Suffolk, Virginia

United States Department of Agriculture, Soil Conservation Service
in cooperation with
the Virginia Polytechnic Institute and State University
and the City of Suffolk, Virginia

THE CITY OF SUFFOLK is in southeastern Virginia, west of the Portsmouth-Norfolk metropolitan area. The city has an area of about 430 square miles, or 275,200 acres.

Although farming and woodland have been the main land uses, urban development from the Portsmouth-Norfolk area is expanding into the city. Most farms produce peanuts, corn, and soybeans. Some farms raise hogs and beef cattle, and there are a few dairy farms.

general nature of the survey area

This section provides data on the climate of the survey area and describes the history and agricultural and industrial activities in the area. Also described are the physiography, relief, and drainage patterns in the area.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Holland, Virginia, in the period 1951 to 1975. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 41 degrees F, and the average daily minimum temperature is 30 degrees. The lowest temperature on record, which occurred at Holland on February 1, 1965, is 1 degree. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at Holland on June 27, 1952, is 105 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 48 inches. Of this, 27 inches, or 60 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 13.4 inches. Thunderstorms occur on about 40 days each year, and most occur in summer.

Average seasonal snowfall is 8 inches. The greatest snow depth at any one time during the period of record was 14 inches. On an average of 3 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 60 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 12 miles per hour, in March.

history

The earliest known inhabitants in the survey area were Indians of the Nansemond tribe, who lived near the banks of what is now the Nansemond River. Captain John Smith led the first settlers into the area in 1608.

The City of Suffolk has been known by several names. Until 1639, when it was organized and named Upper Norfolk County, the area was part of Isle of Wight County. In 1642 it was divided into three parishes—South, East, and West—and in 1646 the name of the county was changed to Nansimum County. By about 1680 the three parishes in the county were called Upper, Lower, and Chicokotuck (Chuckatuck). Some time prior to 1731, Lower and Chicokotuck parishes were merged to form Suffolk parish.

In 1974 the City of Suffolk was formed through a merger between Nansemond County and the town of Suffolk.

agriculture and industry

The main crops in the survey area are corn, soybeans, and peanuts. A small acreage is used for tobacco and wheat, and few areas are in permanent pasture. Ryegrass is often seeded in the row crops, both as a cover crop and for off-season grazing.

The livestock enterprises consist mainly of raising hogs and beef cattle. Several dairy herds and producers of poultry products are in the survey area.

Much of the industry in the area is related to agricultural or wood products, including processing, marketing, and storage of these products, or is concerned with providing services for metropolitan Norfolk, Portsmouth, Newport News, and Hampton.

Coquina shells have been mined in the Chuckatuck area for cement manufacturing. Sand for construction and roadfill is mined in several parts of the survey area, usually at an elevation of less than 50 feet above sea level. Clay deposits in the Kilby area have been mined for brick.

physiography, relief, and drainage

Most of the City of Suffolk is on the Isle of Wight Plain of the middle Coastal Plain, but some sections are on the lower Coastal Plain on the Churchland Flat and in the Dismal Swamp. The Isle of Wight Plain is about 50 to 86 feet above sea level, the Churchland Flat about 5 to 25 feet above sea level, and the Dismal Swamp about 18 to 25 feet above sea level. The Suffolk Scarp, which is at an elevation of 25 to 50 feet, separates the Churchland Flat and the Dismal Swamp from the Isle of Wight Plain.

Most of the City of Suffolk is nearly level and gently sloping, but some small areas near drainageways are sloping to moderately steep. The many small streams and drainageways throughout the survey area have narrow side slopes that blend into gently sloping areas of well drained soils. These gently sloping areas slope upward to the poorly drained upland swamps, or pocosins, which are on large, flat areas.

The overall drainage pattern is well established on the Isle of Wight Plain but is poorly established on the Churchland Flat and in the Dismal Swamp. The northern section of the City of Suffolk is drained by the Nansemond River, which flows north and enters Hampton Roads Harbor. The southern section is drained by the Dismal Swamp and the Blackwater River. Drainage in this area is slow, and some areas have water on the surface during heavy rainfall and prolonged wet periods.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers, home buyers, and others.

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in others but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

areas dominated by moderately well drained and well drained soils that are not flooded

These areas are the most extensive in the survey area. Most of the areas are on the Isle of Wight Plain and the Churchland Flat. Nearly all of the major population centers and much of the better farmland are in these areas.

1. Eunola-Kenansville-Suffolk association

Moderately well drained and well drained soils that have a subsoil of mostly fine sandy loam and sandy clay loam; on uplands

This association makes up about 41 percent of the survey area. The association consists of broad areas of nearly level and gently sloping soils between large drainageways, and narrow areas of sloping and moderately steep soils along large drainageways and streams.

The Eunola soils make up about 34 percent of the association, the Kenansville soils about 15 percent, the Suffolk soils about 10 percent, and minor soils about 41 percent.

The Eunola soils are moderately well drained and moderately permeable. They have a subsoil of fine sandy loam and sandy clay loam and have a seasonal high water table at a depth of 1-1/2 to 2-1/2 feet. The Kenansville soils are well drained and have moderately rapid permeability. They have a subsoil of fine sandy loam, sandy clay loam, and loamy sand. The Suffolk soils are well drained and moderately permeable. They have a subsoil of fine sandy loam and sandy clay loam.

The minor soils of this association are Dogue, Emporia, Goldsboro, Levy, Lynchburg, Nansemond, Rains, Rumford, and Wahee soils and Udorthents. Moderately well drained Dogue and Goldsboro soils and well drained Emporia and Rumford soils are in small areas throughout the association. Very poorly drained Levy soils are in bottoms along drainageways and streams. Somewhat poorly drained Lynchburg and Wahee soils are on small flats and in depressions. Moderately well drained Nansemond soils are on slopes along drainageways and streams. Poorly drained Rains soils are in small swamps. Udorthents are commonly in and near population centers where the soils have been disturbed by construction.

This association is used mainly for farming, but some areas are in woodland and some areas are used for residential development. Much of the association has been cleared, and some areas have been drained. Most areas have good suitability for farming, community development, and woodland.

2. Goldsboro-Dogue-Emporia association

Moderately well drained and well drained soils that have a subsoil of mostly loam, sandy clay loam, clay loam, sandy clay, and clay; on uplands

This association makes up about 4 percent of the survey area. The association consists of broad areas of gently sloping soils and small areas of nearly level soils between large drainageways, and narrow areas of sloping and moderately steep soils along the drainageways.

The Goldsboro soils make up about 39 percent of this association, Dogue soils about 27 percent, Emporia soils about 15 percent, and minor soils about 19 percent.

The Goldsboro soils are moderately well drained and moderately permeable. They have a subsoil of loam and sandy clay loam and have a seasonal high water table at a depth of 2 to 3 feet. The Dogue soils are moderately well drained and have moderately slow permeability. They have a subsoil of clay loam, sandy clay, and sandy clay loam and have a seasonal high water table at a depth of 2 to 3 feet. The Emporia soils are well drained

and have moderate to slow permeability. They have a subsoil of sandy clay loam, clay loam, and clay and have a seasonal high water table at a depth of 3 to 4-1/2 feet.

The minor soils of this association are Eunola, Levy, Lynchhurg, Nansemond, Rains, Rumford, Suffolk, and Wahee soils and Udorthents. Moderately well drained Eunola soils and well drained Rumford and Suffolk soils are on small ridges throughout the association. Very poorly drained Levy soils are in bottoms along drainageways. Somewhat poorly drained Lynchburg and Wahee soils are on small flats and in slight depressions. Moderately well drained Nansemond soils are along drainageways. Poorly drained Rains soils are on small flats and in small swamps. Udorthents are commonly in and near population centers where the soils have been disturbed by construction.

This association is used mostly for farming, but some areas are in woodland and residential developments. A large part of the association has been cleared, and some areas have been drained. The association has good suitability for farming and woodland and fair suitability for community development.

3. Tetotum-State-Nansemond association

Moderately well drained and well drained soils that have a subsoil of mostly fine sandy loam, sandy clay loam, loam, and loamy fine sand; on uplands

This association makes up about 5 percent of the survey area. The association consists of nearly level to moderately steep soils.

Nearly level and gently sloping Tetotum soils make up about 35 percent of the association, nearly level and gently sloping State soils about 10 percent, gently sloping to moderately steep Nansemond soils about 9 percent, and minor soils about 46 percent.

The Tetotum soils are moderately well drained and moderately permeable. They have a subsoil of fine sandy loam, sandy clay loam, clay loam, and loam and have a seasonal high water table at a depth of 1-1/2 to 2-1/2 feet. The State soils are well drained and moderately permeable. They have a subsoil of fine sandy loam and sandy clay loam. The Nansemond soils are moderately well drained and have moderately rapid permeability. They have a subsoil of fine sandy loam and loamy fine sand and have a seasonal high water table at a depth of 1-1/2 to 2-1/2 feet.

The minor soils of this association are Bohicket, Kalmia, Kenansville, and Wahee soils and Udorthents. Very poorly drained Bohicket soils are in small spots in tidal marshes. Well drained Kalmia and Kenansville soils are on small ridges. Somewhat poorly drained Wahee soils are on low-lying flats and in depressions. Udorthents are commonly in and near population centers where the soils have been disturbed by construction.

This association is used mostly for farming. Some areas are in woodland and some in residential development. Most of the acreage has been cleared, and some of the acreage has good suitability for farming, community development, and woodland.

4. Nansemond-Kalmia association

Moderately well drained and well drained soils that have a subsoil of mostly fine sandy loam, loamy fine sand, and sandy clay loam; on uplands

This association makes up about 6 percent of the survey area. The association consists of areas of nearly level to moderately steep soils.

Nearly level to moderately steep Nansemond soils make up about 60 percent of this association, nearly level and gently sloping Kalmia soils about 18 percent, and minor soils about 22 percent.

The Nansemond soils are moderately well drained and have moderately rapid permeability. They have a subsoil of fine sandy loam and loamy fine sand and have a seasonal high water table at a depth of 1-1/2 to 2-1/2 feet. The Kalmia soils are well drained and moderately permeable. They have a subsoil of sandy clay loam.

The minor soils of this association are Bohicket, Dragston, Kenansville, Levy, and Wahee soils and Udorthents. Very poorly drained Bohicket soils are in small spots in tidal marshes. Somewhat poorly drained Dragston and Wahee soils are on small flats and in depressions. Very poorly drained Levy soils are in bottoms along drainageways and streams. Udorthents are commonly in and near population centers where the soils have been disturbed by construction.

This association is used mainly for farming, but some areas are used for woodland or community development. Much of the acreage has been cleared and drained and is suitable for farming, community development, and woodland.

5. Pactolus-Torhunta-Alaga association

Moderately well drained, very poorly drained, and well drained soils that have mostly loamy fine sand, fine sandy loam, and loamy sand below the surface layer; on upland flats

This association makes up about 3 percent of the survey area. The association consists of nearly level and gently sloping, sandy soils and nearly level swamps.

Pactolus soils make up about 30 percent of this association, Torhunta soils about 25 percent, Alaga soils about 14 percent, and minor soils about 31 percent.

The Pactolus soils are moderately well drained and are rapidly permeable. They have a substratum of loamy fine sand and have a seasonal high water table at a depth of 1-1/2 to 2-1/2 feet. They are on broad flats throughout the association. The Torhunta soils are very poorly drained and moderately rapidly permeable. They have a substratum of fine sandy loam and have a seasonal high water table between the surface and a depth of 1-1/2 feet. Torhunta soils are on low-lying flats throughout the association. The Alaga soils are well

drained and rapidly permeable. They have a subsoil of loamy sand. They are on knolls.

The minor soils are Dragston, Kenansville, Levy, Nansemond, Wahee, and Weston soils. Somewhat poorly drained Dragston and Wahee soils and poorly drained Weston soils are on slightly higher flats. Well drained Kenansville soils are on small knolls, and very poorly drained Levy soils are on bottoms in drainageways.

This association is used mostly for woodland, but a few small areas have been cleared and are farmed. Very little acreage has been drained. The association has poor suitability for farming and community development. It has fair suitability for woodland and good suitability for wildlife habitat.

areas dominated by poorly drained and somewhat poorly drained soils that have water on the surface for brief periods

These areas are throughout the survey area, mainly on the Churchland Flat and the Isle of Wight Plain. The areas on the Isle of Wight Plain are at the highest elevations in the city and include the upland swamps, or pocosins.

6. Rains-Lynchburg association

Poorly drained and somewhat poorly drained soils that have a subsoil of mostly loam and sandy clay loam; on upland flats

This association makes up about 15 percent of the survey area. The association consists of broad upland flats and upland swamps, called pocosins. It is at the highest elevations in the survey area.

Rains soils make up about 50 percent of this association, Lynchburg soils about 30 percent, and minor soils about 20 percent.

The Rains soils are poorly drained and moderately permeable. They have a subsoil of loam and sandy clay loam and have a seasonal high water table between the surface and a depth of 1 foot. The Lynchburg soils are somewhat poorly drained and moderately permeable. They have a subsoil of sandy clay loam and have a seasonal high water table at a depth of 1/2 foot to 1-1/2 feet.

The minor soils are Dragston, Emporia, Eunola, Goldsboro, Levy, Nansemond, Wahee, and Weston soils. Somewhat poorly drained Dragston and Wahee soils, well drained Emporia soils, and moderately well drained Eunola, Goldsboro, and Nansemond soils are mostly at the outer edges of the association and on small knolls. Very poorly drained Levy soils and poorly drained Weston soils are mostly along drainageways.

This association is used mostly for woodland, but some areas are used for farming. Some of the acreage has been drained, but outlets for drainage are often difficult to locate. The association has good suitability for woodland and wildlife habitat. If drained, it has good suitability for farming.

7. Tomotley-Weston-Dragston association

Poorly drained and somewhat poorly drained soils that have a subsoil of mostly loam, sandy clay loam, and fine sandy loam; on low-lying flats

This association makes up about 9 percent of the survey area. The association consists of low-lying flats mostly on the Churchland Flat and in the Dismal Swamp.

Tomotley soils make up about 34 percent of this association, Weston soils about 25 percent, Dragston soils about 21 percent, and minor soils about 20 percent.

The Tomotley soils are poorly drained and moderately permeable. They have a subsoil of loam and sandy clay loam and have a seasonal high water table between the surface and a depth of 1 foot. The Weston soils are poorly drained and have moderately slow permeability. They have a subsoil of loam and fine sandy loam and have a seasonal high water table between the surface and a depth of 1 foot. The Dragston soils are somewhat poorly drained and have moderately rapid permeability. They have a subsoil of fine sandy loam and have a seasonal high water table at a depth of 1 foot to 2-1/2 feet.

The minor soils are Belhaven, Levy, Torhunta, and Wahee soils. Very poorly drained Belhaven and Torhunta soils are in slight depressions. Very poorly drained Levy soils are along small drainageways. Somewhat poorly drained Wahee soils are on slightly higher areas throughout the association.

This association is used mostly for woodland. Some areas have been cleared and drained and are used for farming, but there are many swampy, undrained areas. Outlets for drainage are difficult to locate. The association has good suitability for woodland and wildlife habitat. If drained, it has good suitability for farming.

8. Levy-Rains-Lynchburg association

Very poorly drained, poorly drained, and somewhat poorly drained soils that have mostly clay, loam, and sandy clay loam below the surface layer; in low-lying swamps

This association makes up about 2 percent of the survey area. The association consists of nearly level, swampy areas along slow streams.

Levy soils make up about 35 percent of this association, Rains soils about 30 percent, Lynchburg soils about 20 percent, and minor soils about 15 percent.

The Levy soils are very poorly drained and slowly permeable. They have a substratum of clay and have a seasonal high water table at or near the surface. The Rains soils are poorly drained and moderately permeable. They have a subsoil of loam and sandy clay loam and have a seasonal high water table between the surface and a depth of 1 foot. The Lynchburg soils are

somewhat poorly drained and moderately permeable. They have a subsoil of sandy clay loam and have a seasonal high water table at a depth of 1/2 foot to 1-1/2 feet.

The minor soils are somewhat poorly drained Dragston soils and moderately well drained Eunola, Goldsboro, and Nansemond soils. These soils are at the outer edges of the association and are on higher areas and knolls.

This association is used mainly for woodland. A few small areas at the edges are used for farming. Drainage outlets are difficult to locate. The association has good suitability for woodland and wildlife habitat and poor suitability for most other uses.

areas dominated by very poorly drained soils that are subject to flooding for long periods

These areas are on the Dismal Swamp Terrace and along the Nansemond River. They include the Dismal Swamp and its tidal marshes. Drainage and flood protection are difficult to install in these areas.

9. Torhunta-Deloss association

Very poorly drained soils that have a subsoil of mostly fine sandy loam and sandy clay loam; in the Dismal Swamp

This association makes up about 3 percent of the survey area. The association consists of nearly level soils along the western and northern edges of the Dismal Swamp.

Torhunta soils make up about 40 percent of this association, Deloss soils about 35 percent, and minor soils about 25 percent.

The Torhunta soils are moderately rapidly permeable. They have a subsoil of fine sandy loam and have a seasonal high water table between the surface and a depth of 1-1/2 feet. The Deloss soils are moderately permeable. They have a subsoil of sandy clay loam and fine sandy loam and have a seasonal high water table between the surface and a depth of 1 foot.

The minor soils are very poorly drained Belhaven and Pungo soils and poorly drained Weston soils. The Belhaven and Pungo soils are in low areas where organic matter has accumulated. The Weston soils are on slightly higher areas.

This association is used mainly for woodland and wildlife habitat, but a few areas have been cleared and drained and are used for pasture. The association has good suitability for woodland and wildlife habitat but very poor suitability for farming.

10. Pungo-Belhaven association

Very poorly drained soils that have mostly organic material below the surface layer; in the Dismal Swamp

This association makes up about 11 percent of the survey area. The association consists of nearly level soils in the central part of the Dismal Swamp.

Pungo soils make up about 43 percent of this association, Belhaven soils about 41 percent, and minor soils about 16 percent.

The Pungo soils are moderately permeable. They have a subsurface layer of organic material and have a seasonal high water table between the surface and a depth of 1 foot. The Belhaven soils are moderately slowly permeable. They have a subsurface layer of organic material and a substratum of silty clay loam and have a seasonal high water table between the surface and a depth of 1 foot.

The minor soils are very poorly drained Deloss and Torhunta soils on ridges and in small areas in the northern part of the association.

This association is used for woodland and wildlife habitat. Drainage installation is impractical. The association has good suitability for woodland and wildlife habitat but poor suitability for most other uses.

11. Bohicket association

Very poorly drained soils that have mostly silty clay below the surface layer; in tidal marshes

This association makes up 1 percent of the survey area. The association is mostly along the Nansemond River and Hampton Roads in nearly level marshes that are subject to tidal inundation.

Bohicket soils make up about 90 percent of this association and minor soils about 10 percent.

The Bohicket soils have very slow permeability. They have a substratum of silty clay.

The minor soils are well drained Kenansville soils and moderately well drained Nansemond soils. Both are throughout and along the edges of the association next to the uplands in areas not covered by tides.

This association has little suitability for most uses other than wetland wildlife habitat.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Nansemond loamy fine sand, 6 to 15 percent slopes, is one of several phases in the Nansemond series.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

soil descriptions

1B—Alaga loamy sand, wet substratum, 2 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on terraces. Areas of this soil are long and narrow or circular, and they range from about 10 to 100 acres.

Typically, the surface layer of this soil is dark brown loamy sand about 9 inches thick. The substratum extends to a depth of at least 80 inches. It is yellow loamy sand and brown sand.

Included with this soil in mapping are small areas of moderately well drained to somewhat poorly drained Pactolus soils in slight depressions. They make up about 10 percent of the unit.

The permeability of this Alaga soil is rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is moderate. The surface layer is friable and easily tilled. The substratum has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid through medium acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 4 to 6 feet during winter and early spring.

Most areas of this soil are in woodland. A few areas are farmed, and a few are in pasture.

This soil is moderately well suited to cultivated crops and to pasture and hay. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low available water capacity. The soil is well suited to some truck crops, especially if irrigation is used. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content, hold moisture in the soil, and reduce erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing cuts the soft surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, sycamore, sweetgum, and yellow-poplar. Drought during the growing season hinders the survival of seeds and seedlings.

The rapid permeability of the substratum, the seasonal high water table, and the sandy texture of the soil are the main limitations for community development. The rapid permeability and high water table cause a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields or sanitary landfills. The sandy texture causes the soil to cave in during excavation and makes the surface of the soil dusty when dry. The soil has a low moisture holding capacity, which limits the growth of grasses and shrubs.

The capability subclass is IIIs.

2—Belhaven muck. This soil is deep, nearly level, and very poorly drained. It is in the Dismal Swamp. The areas of this soil are broad and long and range from about 100 to 1,000 acres. Slopes range from 0 to 1 percent.

Typically, the surface layer of this soil is black, well decomposed organic material about 9 inches thick. The subsurface layers are black and dark reddish brown, well decomposed organic material 35 inches thick. The substratum is dark gray silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of very poorly drained Deloss and Pungo soils. The Deloss soils are in the part of the map unit that is along the outer edges of the Dismal Swamp, and the Pungo soils are nearer to the interior of the swamp. Some areas have water on the surface for long periods. Included soils make up about 15 percent of the unit.

The permeability of this Belhaven soil is moderately slow, and available water capacity is high. Surface runoff is very slow. The erosion hazard is slight. The root zone is limited by a seasonal high water table that is within 12 inches of the surface in winter and spring. The soil is extremely acid in the organic layers and extremely acid through strongly acid in the mineral substratum.

Undrained areas of this soil are not suited to cultivated crops or to pasture or hay. If drained, the soil is moderately well suited to farming, but drainage outlets are difficult to locate.

The potential productivity for trees on this soil is moderate, especially for loblolly pine, pond pine, baldcypress, Atlantic white cedar, red maple, and sweetgum. Most areas are wooded. Seeds and seedlings are often smothered by dense undergrowth. The soft, wet soil will not support most types of heavy timber equipment.

The thick organic layers, the high water table, and ponding preclude use of the soil for most types of community development.

The capability subclass is VIIw.

3—Bohicket silty clay loam. This soil is deep, nearly level, and very poorly drained. It is on tidal marshes along the Nansemond River, Hampton Roads, and smaller streams. Areas of this soil are commonly long and winding, but some are very broad. The areas range from about 3 to 100 acres. Slopes range from 0 to 1 percent.

Typically, the surface layer of this soil is dark grayish brown silty clay loam about 13 inches thick. The substratum is silty clay to a depth of at least 60 inches.

Included with this soil in mapping are small areas of well drained Kenansville soils and moderately well drained to somewhat poorly drained Pactolus soils. These soils are on islands in the tidal marshes and are not flooded by tidal waters. Also included are a few areas that have a surface layer of silt loam. Included soils make up about 10 percent of the unit.

The permeability of this Bohicket soil is very slow, and available water capacity in high. Surface runoff is very slow. The soil is high in organic matter content and high in natural fertility. The substratum has a high shrink-swell potential. The soil is neutral through moderately alkaline, but becomes extremely acid when dry. It is flooded daily by tidal water and is continuously saturated.

Most areas of this soil are in saltwater-tolerant grasses and forbs.

Tidal flooding, low strength, wetness, the high shrink-swell potential, and a high sulfur content make this soil unsuitable for most uses other than as wetland wildlife habitat.

The capability subclass is VIIIw.

4—Deloss mucky loam. This soil is deep, nearly level, and very poorly drained. It is primarily along the perimeter of the Dismal Swamp in long interconnecting bands. The areas range from about 10 to 100 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is dark gray mucky loam about 10 inches thick. The subsurface layer is dark grayish brown fine sandy loam 7 inches thick. The subsoil is mottled, gray sandy clay loam and fine sandy loam 43 inches thick. The substratum is mottled, greenish gray stratified loam and fine sandy loam to a depth of at least 75 inches.

Included with this soil in mapping are small areas of very poorly drained Belhaven soils and poorly drained Tomotley soils. The Belhaven soils are in slight depressions, and the Tomotley soils are on slightly higher areas throughout the unit. Also included are small areas of soils with a clayey subsoil and soils with a surface layer of fine sandy loam. Included soils make up about 10 percent of the unit.

The permeability of this Deloss soil is moderate, and available water capacity is high. Surface runoff is very slow. The erosion hazard is slight. The subsoil has a low shrink-swell potential. The root zone is limited by a seasonal high water table between the surface and a depth of 1 foot for up to 6 months in winter and spring.

The soil is high in organic matter and low in natural fertility. It commonly is very strongly acid through medium acid in the surface layer and subsoil, but ranges from extremely acid through neutral in the substratum. Water is ponded on the surface for long periods in winter and spring.

Undrained areas of this soil are not suited to cultivated crops or to pasture or hay. If drained, the soil is moderately well suited to farming, but outlets are difficult to locate.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, pond pine, water oak, sweetgum, and willow oak. Most areas are wooded. Seeds and seedlings survive and grow well only if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of heavy timber equipment.

The seasonal high water table and water on the surface limit the soil for most types of community development.

The capability subclass is IIIw if drained and VIw if undrained.

5A—Dogue fine sandy loam, 0 to 2 percent slopes. This soil is deep, nearly level, and moderately well drained. It is on broad, low ridges and stream terraces. Most areas of this soil are long and narrow. They range from about 3 to 100 acres.

Typically, the surface layer of this soil is light brownish gray fine sandy loam about 6 inches thick. The subsurface layer is yellowish brown fine sandy loam 10 inches thick. The subsoil extends to a depth of at least 63 inches. It is mostly yellowish brown clay loam, sandy clay, and sandy clay loam and is mottled at a depth of more than 24 inches.

Included with this soil in mapping are small areas of well drained Emporia soils, moderately well drained Eunola soils, and somewhat poorly drained Wahee soils. The Emporia and Eunola soils are throughout the unit. The Wahee soils are in slight depressions or at slightly lower positions. Included soils make up about 15 percent of the unit.

The permeability of this Dogue soil is moderately slow, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth at 1-1/2 to 3 feet during winter and early spring.

Most areas of this soil are farmed. Some areas are in woodland, and a few are in pasture.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. The soil is wet and cold in the early spring, and wetness often interferes with early tillage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, and oaks. Seeds and seedlings survive and grow well. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table and the shrink-swell potential of the subsoil are the main limitations of the soil for community development. The seasonal high water table limits use of the soil as a building site and as a site for sanitary landfills or septic tank absorption fields. The soil needs a suitable base material to provide enough strength and stability to support vehicular traffic.

The capability subclass is IIw.

5B2—Dogue fine sandy loam, 2 to 6 percent slopes, eroded. This soil is deep, gently sloping, and moderately well drained. It is on narrow ridges and side slopes. Most areas of this soil are long and winding and range from about 3 to 40 acres.

Typically, the surface layer of this soil is light brownish gray fine sandy loam about 6 inches thick. The subsurface layer is yellowish brown fine sandy loam 4 inches thick. The subsoil extends to a depth of at least 63 inches. It is mostly yellowish brown clay loam, sandy clay, and sandy clay loam and is mottled at a depth of more than 18 inches.

Included with this soil in mapping are small areas of well drained Emporia soils, moderately well drained Eunola soils, and somewhat poorly drained Wahee soils. The Emporia and Eunola soils are throughout the unit. The Wahee soils are in slight depressions or at slightly lower positions. Included soils make up about 15 percent of the unit.

The permeability of this Dogue soil is moderately slow, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60

inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth at 1-1/2 to 3 feet during winter and early spring.

Most areas of this soil are farmed. Some areas are in woodland, and a few are in pasture.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. The soil is wet and cold in the early spring, and wetness often interferes with early tillage. Minimum tillage, using of cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, increase water infiltration, and reduce erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, and oaks. Seeds and seedlings survive and grow well. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table and the shrink-swell potential of the subsoil are the main limitations of the soil for community development. The seasonal high water table limits use of the soil as a building site and as a site for sanitary landfills or septic tank absorption fields. The soil needs a suitable base material to provide enough strength and stability to support vehicular traffic.

The capability subclass is IIe.

6—Dragston fine sandy loam. This soil is deep, nearly level, and somewhat poorly drained. It is on broad, level uplands between drainageways and along the edges of upland swamps. Areas of this soil commonly are oblong and range from about 3 to 50 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 9 inches thick. The subsoil mostly is mottled, brown fine sandy loam 28 inches thick. The substratum is mottled, brownish yellow fine sand to a depth of at least 66 inches.

Included with this soil in mapping are small areas of moderately well drained Tetotum soils and poorly drained Tomotley soils. The Tetotum soils are in small, slightly convex areas; the Tomotley soils are in slight depressions. Included soils make up about 15 percent of the unit.

The permeability of this Dragston soil is moderately rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1 foot to 2-1/2 feet during winter and spring.

Most areas of this soil are farmed. Some areas are in woodland, and some are in pasture.

If drained, this soil is well suited to cultivated crops and moderately well suited to pasture and hay. Drainage systems are difficult to install, however, because of the wet, sandy substratum. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low available water capacity. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and hold moisture in the soil.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing cuts the soft surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is high, but drought during the growing season limits the survival of seeds and seedlings. Loblolly pine, sweetgum, and oaks grow well on this soil. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table and the moderately rapid permeability of the soil are the main limitations for community development. They especially limit the use of the soil as a building site or as a site for sanitary landfills or septic tank absorption fields and cause a contamination hazard to ground water and nearby streams in areas used for septic tanks or landfills.

The capability subclass is IIw if drained and IIIw if undrained.

7A—Emporia fine sandy loam, 0 to 2 percent slopes. This soil is deep, nearly level, and well drained. It is on narrow upland ridges. Areas of this soil commonly are long and winding. They range from about 3 to 40 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 10 inches thick. The subsoil extends to a depth of at least 72 inches. It mostly is multicolored sandy clay loam, clay loam, and clay and is mottled at a depth of more than 41 inches.

Included with this soil in mapping are small areas of well drained Kenansville soils and moderately well drained Nansemond soils. The Kenansville soils are on small knolls, and the Nansemond soils are in shallow depressions. Included soils make up about 10 percent of the unit.

The permeability of this Emporia soil is moderate in the upper part of the subsoil and moderately slow to

slow in the lower part. The available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A perched seasonal high water table is at a depth of 3 to 4-1/2 feet during winter and spring.

Most areas of this soil are farmed. Some small areas are in woodland.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and reduces the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, sweetgum, yellow-poplar, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

The low strength of the soil, moderate shrink-swell potential, seasonal high water table, and slow permeability of the subsoil are the main limitations for community development. The low strength and moderate shrink-swell potential limit use of the soil as a building site, and the high water table limits excavations. The slow permeability and the high water table also limit use of the soil for septic tank absorption fields.

The capability class is I.

7B2—Emporia fine sandy loam, 2 to 6 percent slopes, eroded. This soil is deep, gently sloping, and well drained. It is adjacent to major drainageways. Areas of this soil commonly are long and winding. They range from 3 to 40 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 6 inches thick. The subsoil extends to a depth of at least 72 inches. It mostly is multicolored sandy clay loam, clay loam, and clay and is mottled at a depth of more than 37 inches.

Included with this soil in mapping are small areas of well drained Kenansville soils and moderately well drained Nansemond soils. The Kenansville soils are on small knolls, and the Nansemond soils are in shallow depressions. Included soils make up about 10 percent of the unit.

The permeability of this Emporia soil is moderate in the upper part of the subsoil and moderately slow to slow in the lower part. The available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A perched seasonal high water table is at a depth of 3 to 4-1/2 feet during winter and spring.

Most areas of this soil are farmed. Some of the acreage is in woodland.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, sweetgum, and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled.

The low strength of the soil, moderate shrink-swell potential, seasonal high water table, and slow permeability of the subsoil are the main limitations for community development. The low strength and moderate shrink-swell potential limit use of the soil as a building site, and the perched high water table limits excavation. The slow permeability and the water table also limit use of the soil for septic tank absorption fields.

The capability subclass is IIe.

8A—Eunola loamy fine sand, 0 to 2 percent slopes. This soil is deep, nearly level, and moderately well drained. It is on narrow to broad ridges. Areas of this soil commonly are long and narrow and range from about 4 to 25 acres.

Typically, the surface layer of this soil is grayish brown loamy fine sand about 9 inches thick. The subsoil is mottled and extends to a depth of at least 63 inches. It is mostly brown fine sandy loam and sandy clay loam.

Included with this soil in mapping are small areas of somewhat poorly drained Lynchburg soils and well drained Suffolk soils. The Lynchburg soils are in slight depressions. The Suffolk soils are on slightly higher areas throughout the unit. Included soils make up about 10 percent of this unit.

The permeability of this Eunola soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60

inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1-1/2 to 2-1/2 feet during winter and early spring.

Most areas of this soil are farmed (fig. 1). A few areas are in woodland.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. The soil is wet in spring in some areas. Drainage helps to alleviate wetness and protects crops from damage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, yellow-poplar, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment.

Figure 1.—Farmland on an area of Eunola loamy fine sand, 0 to 2 percent slopes.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site, as a site for sanitary landfills or septic tank absorption fields, and for most types of recreation.

The capability subclass is IIw.

8B—Eunola loamy fine sand, 2 to 6 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on narrow to broad ridges and side slopes. Areas of this soil commonly are long and narrow and range from about 4 to 25 acres.

Typically, the surface layer of this soil is grayish brown loamy fine sand about 9 inches thick. The subsoil is mottled and extends to a depth of at least 63 inches. It is mostly brown fine sandy loam and sandy clay loam.

Included with this soil in mapping are small areas of somewhat poorly drained Lynchburg soils and well drained Suffolk soils. The Lynchburg soils are in slight depressions. The Suffolk soils are on slightly higher areas throughout the unit. Included soils make up about 10 percent of the unit.

The permeability of this Eunola soil is moderate, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1-1/2 to 2-1/2 feet during winter and spring.

Most areas of this soil are farmed. A few areas are in woodland.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. The soil is wet in spring in some areas. Drainage helps to alleviate wetness and protects crops from damage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, increase water infiltration, and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, yellow-poplar, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal water table is the main limitation of the soil for community development, especially as a building

site, as a site for sanitary landfills or septic tank absorption fields, and for most types of recreation.

The capability subclass is IIe.

9A—Goldsboro fine sandy loam, 0 to 2 percent slopes. This soil is deep, nearly level, and moderately well drained. It is on broad upland flats. Areas of this soil commonly are irregularly oval and range from about 4 to 60 acres.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 13 inches thick. The subsurface layer is light yellowish brown fine sandy loam 5 inches thick. The subsoil is mottled and extends to a depth of at least 70 inches. It is mostly yellow and brown loam and sandy clay loam.

Included with this soil in mapping are small areas of poorly drained Rains soils in slight depressions. They make up about 5 percent of the unit. Also included are small areas of slowly permeable soils that make up about 10 percent of the unit.

The permeability of this Goldsboro soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 2 to 3 feet during winter and early spring.

Most areas of this soil are farmed. A few areas are in woodland, and a few are in pasture.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. The soil is wet in spring in some areas. Drainage helps to alleviate wetness and protects crops from damage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, yellow-poplar, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site, as a site for sanitary landfills or septic tank absorption fields, and for some types of recreation.

The capability subclass is IIw.

9B2—Goldsboro fine sandy loam, 2 to 5 percent slopes, eroded. This soil is deep, gently sloping, and moderately well drained. It is on ridges and side slopes along small drainageways. Areas of this soil commonly are irregularly oval and range from about 4 to 20 acres.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 6 inches thick. The subsurface layer is light yellowish brown fine sandy loam 5 inches thick. The subsoil is mottled and extends to a depth of at least 70 inches. It is mostly yellow and brown loam and sandy clay loam.

Included with this soil in mapping are small areas of poorly drained Rains soils along small drainageways that make up about 5 percent of the unit. Also included are small areas of slowly permeable soils that make up about 10 percent of the unit.

The permeability of this Goldsboro soil is moderate, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 2 to 3 feet during winter and early spring.

Most areas of this soil are farmed. A few areas are in woodland, and a few are in pasture.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. The soil is wet in spring in some places. Drainage helps to alleviate wetness and protects crops from damage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, increase water infiltration, and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, yellow-poplar, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site, as a site for sanitary landfills or septic tank absorption fields, and for some types of recreation.

The capability subclass is IIe.

10A—Kalmia fine sandy loam, wet substratum, 0 to 2 percent slopes. This soil is deep, nearly level, and well drained. It is on low terraces along the Nansemond River and Hampton Roads. Areas of this soil commonly are elongated or irregularly circular. They range from about 5 to 50 acres.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light yellowish brown and light gray fine sandy loam 18 inches thick. The subsoil is mostly dark yellowish brown sandy clay loam 12 inches thick. The substratum is light yellowish brown and brownish yellow loamy fine sand and fine sandy loam to a depth of at least 72 inches.

Included with this soil in mapping are small areas of moderately well drained Nansemond soils and well drained Kenansville soils. These soils are throughout the map unit and make up about 10 percent of the unit.

The permeability of this Kalmia soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 4 to 6 feet during winter and spring.

Most areas of this soil are farmed, but some areas are in woodland.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer.

The potential productivity for trees on this soil is high, especially for loblolly pine, yellow-poplar, sweetgum, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Rapid permeability in the substratum and the seasonal high water table are the main limitations of the soil for community development. Both cause a hazard of pollution to ground water and nearby streams in areas used for sanitary landfills or septic tank absorption fields.

The capability class is I.

10B—Kalmia fine sandy loam, wet substratum, 2 to 6 percent slopes. This soil is deep, gently sloping, and well drained. It is on low terraces along the Nansemond River and Hampton Roads. Areas of this soil commonly are elongated or circular. They range from about 5 to 50 acres.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light yellowish brown and light gray fine sandy loam 18 inches thick. The subsoil is mostly dark yellowish brown sandy clay loam 12 inches thick. The substratum is light yellowish brown and brownish yellow loamy fine sand and fine sandy loam to a depth of at least 72 inches.

Included with this soil in mapping are small areas of moderately well drained Nansemond soils and well drained Kenansville soils. These soils are throughout the map unit and make up about 10 percent of the unit.

The permeability of this Kalmia soil is moderate, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 4 to 6 feet during winter and spring.

Most areas of this soil are farmed, but some areas are in woodland.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content, reduce crusting, increase water infiltration, and reduce erosion.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer.

The potential productivity for trees on this soil is high, especially for loblolly pine, yellow-poplar, sweetgum, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Rapid permeability in the substratum and the seasonal high water table are the main limitations of the soil for community development. Both cause a hazard of pollution to ground water and nearby streams in areas used for sanitary landfills and septic tank absorption fields.

The capability subclass is IIe.

11—Kenansville loamy sand, 0 to 4 percent slopes. This soil is deep, nearly level to gently sloping, and well drained. It is on broad ridges. Areas of this soil commonly are long and winding or irregularly oval. They range from about 3 to 70 acres.

Typically, the surface layer of this soil is dark grayish brown loamy sand about 3 inches thick. The subsurface layer is olive yellow loamy sand 20 inches thick. The subsoil is mostly brown fine sandy loam, sandy clay

loam, and loamy sand 33 inches thick. The substratum is brown loamy sand and sand to a depth of at least 72 inches.

Included with this soil in mapping are small areas of moderately well drained Eunola soils, moderately well drained to somewhat poorly drained Pactolus soils, and well drained Suffolk soils. The Eunola and Pactolus soils are in small depressions, and the Suffolk soils are throughout the map unit. Included soils make up about 15 percent of this unit.

The permeability of this Kenansville soil is moderately rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard from water is slight, but the wind erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices.

Most areas of this soil are farmed, and a few areas are in woodland.

This soil is well suited to cultivated crops and moderately well suited to pasture and hay. The soil is droughty during the growing season, however, and crop response to lime and fertilizer is limited by the low available water capacity. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and hold moisture in the soil.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing cuts the soft surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, but the survival of seeds and seedlings is limited by drought during the growing season.

The moderately rapid permeability of the soil and the sandy texture of the surface layer and substratum are the main limitations for community development. The permeability causes a hazard of contamination to ground water and nearby streams in areas used for septic tank absorption fields or sanitary landfills. The sandy texture limits excavation, and the surface of the soil is dusty when dry. The soil holds a low amount of moisture, which limits the growth of grasses and shrubs.

The capability subclass is IIs.

12—Kenansville loamy sand, wet substratum, 0 to 4 percent slopes. This soil is deep, nearly level to gently sloping, and well drained. It is on stream terraces and low ridges, generally at an elevation of less than 30 feet. Areas of this soil commonly are long and narrow or circular. They range from about 10 to 100 acres.

Typically, the surface layer of this soil is dark grayish brown loamy sand about 3 inches thick. The subsurface layer is olive yellow loamy sand 20 inches thick. The subsoil is mostly brown fine sandy loam, sandy clay loam, and loamy sand 33 inches thick. The substratum is brown loamy sand and sand to a depth of at least 72 inches.

Included with this soil in mapping are small areas of moderately well drained Eunola soils and well drained Suffolk soils. These soils commonly are throughout the map unit and make up about 5 percent of the unit.

The permeability of this Kenansville soil is moderately rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard from water is slight, but the wind erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 4 to 6 feet during winter and spring.

Most areas of this soil are farmed, and a few are in woodland.

This soil is well suited to cultivated crops and moderately well suited to pasture and hay. The soil is droughty during the growing season, however, and crop response to lime and fertilizer is limited by the low available water capacity. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and hold moisture in the soil.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing cuts the soft surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, but the survival of seeds and seedlings is limited by drought during the growing season.

The moderately rapid permeability, the sandy texture of the soil, and the seasonal high water table are the main limitations for community development. The permeability and high water table cause a hazard of pollution to ground water and nearby streams in areas used for septic tank absorption fields and sanitary landfills. The sandy texture limits excavation, and the surface of the soil is dusty when dry. The soil holds a low amount of moisture, which limits the growth of grasses and shrubs.

The capability subclass is IIs.

13—Levy silty clay loam. This soil is deep, nearly level, and very poorly drained. It is on flood plains and in swamps along drainageways. Areas of this soil

commonly are long and winding. They range from about 5 to 1,000 acres. Slopes range from 0 to 1 percent.

Typically, the surface layer of this soil is very dark grayish brown silty clay loam about 10 inches thick. The substratum is gray clay to a depth of at least 60 inches.

Included with this soil in mapping are small areas of moderately well drained Nansemond soils and poorly drained Rains soils. These soils are on higher areas throughout the map unit and make up about 15 percent of the unit.

The permeability of this Levy soil is slow, and available water capacity is high. Surface runoff is very slow. This soil is saturated continuously and has water on the surface frequently throughout the year. The soil is extremely acid or very strongly acid in the upper 40 inches and ranges from very strongly acid through medium acid below a depth of 40 inches. The substratum has a high shrink-swell potential.

Most areas of this soil are in woodland or water-tolerant grasses and forbs.

The water in and on the soil make this unit generally unsuitable for farming or community development. A lack of suitable outlets makes drainage impractical. The potential for trees such as tupelo, sweetgum, red maple, and baldcypress is moderately high, but wetness and a dense undergrowth hinder the survival of seeds and seedlings (fig. 2). The soil is very soft, thus limiting the use of heavy timber equipment.

The capability subclass is VIIw.

14—Lynchburg fine sandy loam. This soil is deep, nearly level, and somewhat poorly drained. It is adjacent to broad uplands, locally called pocosins, and is in small

Figure 2.—Baldcypress, red maple, and water tupelo in a swampy area of Levy silty clay loam.

areas along streams. Areas of this soil commonly are elongated, but some smaller areas are irregularly oval. The areas range from about 4 to 100 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of at least 63 inches. It is mostly light yellowish brown fine sandy loam and sandy clay loam in the upper part and gray sandy clay loam in the lower part.

Included with this soil in mapping are small areas of moderately well drained Eunola soils, somewhat poorly drained Wahee soils, and poorly drained Rains soils. The Eunola soils are on slightly higher, oval or elongated ridges. The Rains soils are around small drainageways and in depressions. The Wahee soils are throughout the map unit. Included soils make up about 20 percent of this unit.

The permeability of this Lynchburg soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. Water is occasionally ponded on the surface for brief periods after heavy or prolonged rains. A seasonal high water table is at a depth of 1/2 foot to 1-1/2 feet during winter and spring.

About half of the area of this soil is farmed. Most of the rest is in woodland.

If drained, this soil is well suited to cultivated crops and moderately well suited to pasture and hay. Crops respond well to lime and fertilizer but are sometimes damaged by ponding after heavy or prolonged rains. The soil is wet and cold in spring, and wetness often interferes with tillage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, yellow-poplar, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site, as a site for sanitary landfills or septic tank absorption fields, and for most types of recreation.

The capability subclass is IIw.

15B—Nansemond loamy fine sand, 0 to 6 percent slopes. This soil is deep, nearly level to gently sloping, and moderately well drained. It is on narrow to broad ridgetops and side slopes. Areas of this soil are elongated. They range from about 3 to 30 acres.

Typically, the surface layer of this soil is grayish brown loamy fine sand about 19 inches thick. The subsoil is mostly yellowish brown and brownish yellow fine sandy loam and loamy fine sand 47 inches thick. The substratum is mostly light gray fine sand to a depth of at least 70 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Dragston soils in slight depressions throughout the map unit. Also included are areas of soils with a sandy surface layer more than 19 inches thick. Included soils make up about 20 percent of this unit.

The permeability of this Nansemond soil is moderately rapid, and available water capacity is low. Surface runoff is slow. The water erosion hazard is slight, and the wind erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1-1/2 to 2-1/2 feet during winter and early spring.

Most areas of this soil are farmed. Some areas are in woodland, and a few are in pasture.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer, but the soil is droughty during periods of low rainfall. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, yellow-poplar, sweetgum, and oaks. Seed and seedlings survive and grow well. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table, the moderately rapid permeability of the subsoil, and the sandy texture of the substratum are the main limitations of the soil for community development. The seasonal high water table

limits use of the soil as a building site and as a site for sanitary landfills or septic tank absorption fields. The moderately rapid permeability of the subsoil and the sandy substratum cause a contamination hazard to ground water and nearby streams in areas used for septic tanks or landfills. The sandy texture limits excavation, and the surface of the soil is dusty when dry. The soil holds a low amount of moisture, which limits the growth of grasses and shrubs.

The capability subclass is IIe.

15D—Nansemond loamy fine sand, 6 to 15 percent slopes. This soil is deep, sloping to moderately steep, and moderately well drained. It is on the sides of drainageways and depressions. Areas of this soil commonly are long and winding. They range from about 5 to 1,000 acres.

Typically, the surface layer of this soil is grayish brown loamy fine sand about 19 inches thick. The subsoil is mostly yellowish brown and brownish yellow fine sandy loam and loamy fine sand 47 inches thick. The substratum is mostly light gray fine sand to a depth of at least 70 inches.

Included with this soil in mapping are small areas of poorly drained soils commonly on small flats, in drainageways, and on lower side slopes throughout the unit. Also included are areas of soils with a sandy surface layer more than 19 inches thick. Included soils make up about 15 percent of this unit.

The permeability of this Nansemond soil is moderately rapid, and available water capacity is low. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table or lateral seepage is at a depth of 1-1/2 to 2-1/2 feet during winter and spring.

Most areas of this soil are in woodland. Some areas are farmed.

This soil is poorly suited to cultivated crops and moderately well suited to pasture and hay. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low available water capacity. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content, hold moisture in the soil, and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing cuts the soft surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, yellow-poplar, sweetgum, and oaks. Seeds and seedlings survive and grow well. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table, the moderately rapid permeability of the subsoil, the sandy texture of the substratum, and slope are the main limitations of the soil for community development. The water table, the moderately rapid permeability, and the sandy substratum cause a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields or sanitary landfills. Slope also limits use of the soil for septic tanks and landfills. The sandy texture hinders excavation, and the surface of the soil is dusty when dry. The soil holds a low amount of moisture, which limits the growth of grasses and shrubs.

The capability subclass is IVe.

15E—Nansemond loamy fine sand, 15 to 30 percent slopes. This soil is deep, steep to very steep, and moderately well drained. It is on the side slopes of drainageways. Areas of this soil commonly are long and winding. They range from about 5 to 100 acres.

Typically, the surface layer of this soil is grayish brown loamy fine sand about 19 inches thick. The subsoil is mostly yellowish brown and brownish yellow fine sandy loam and loamy fine sand 47 inches thick. The substratum is mostly light gray fine sand to a depth of at least 70 inches.

Included with this soil in mapping are small areas of poorly drained soils that are in small drainageways and on lower side slopes throughout the unit. Also included are small areas of soils with a sandy surface layer more than 19 inches thick. Included soils make up about 20 percent of this unit.

The permeability of this Nansemond soil is moderately rapid, and available water capacity is low. Surface runoff is rapid. The erosion hazard is severe. The surface layer is friable and the subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It ranges from extremely acid through strongly acid. It commonly has lateral seepage of water at a depth of 1-1/2 to 2-1/2 feet during winter and early spring. Seeps and springs are often along the lower edges of slopes.

Slope limits the use of farm equipment and makes the soil generally unsuitable for farming. Most areas of this soil are in woodland. The potential productivity for trees is high, especially for loblolly pine, yellow-poplar, hickory, and oaks, but the slope also limits the safe operation of heavy timber equipment. Placing logging roads and skid trails on the contour of the landscape reduces the concentration of runoff and helps to control erosion.

Slope is the main limitation of the soil for community development, especially as a building site or as a site for septic tank absorption fields or sanitary landfills.

The capability subclass is VIe.

16A—Nansemond fine sandy loam, 0 to 2 percent slopes. This soil is deep, nearly level, and moderately well drained. It is on broad ridges. Areas of this soil commonly are oval. They range from about 10 to 200 acres.

Typically, the surface layer of this soil is grayish brown fine sandy loam about 8 inches thick. The subsoil is mostly brown and yellow fine sandy loam and loamy fine sand 58 inches thick. The substratum is mostly light gray fine sand to a depth of at least 70 inches.

Included with this soil in mapping are small areas of poorly drained Weston soils at the head of and along drainageways. These soils make up about 10 percent of the unit.

The permeability of this Nansemond soil is moderately rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1-1/2 to 2-1/2 feet during winter and early spring.

Most areas of this soil are farmed. Some areas are in woodland, and a few are in pasture.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, shortleaf pine, yellow-poplar, sweetgum, and oaks. Seed and seedlings survive and grow well. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table, the moderately rapid permeability of the subsoil, and the sandy texture of the substratum are the main limitations of the soil for community development. The water table limits use of the soil as a building site or as a site for sanitary landfills or septic tank absorption fields. The permeability of the subsoil and the sandy substratum cause a contamination hazard to ground water and nearby streams in areas used for septic tanks or landfills. The sandy texture limits excavation, and the surface of the soil is dusty when dry. The soil holds a low amount of moisture, which limits the growth of grasses and shrubs.

The capability subclass is IIw.

16B—Nansemond fine sandy loam, 2 to 6 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on side slopes adjacent to drainageways. Areas of this soil are long and narrow. They range from about 10 to 20 acres.

Typically, the surface layer of this soil is grayish brown fine sandy loam about 8 inches thick. The subsoil is mostly brown and yellow fine sandy loam and loamy fine sand 58 inches thick. The substratum is mostly light gray fine sand to a depth of at least 70 inches.

Included with this soil in mapping are small areas of poorly drained, nearly level to gently sloping soils that are near drainageways. These soils make up about 10 percent of the unit.

The permeability of this Nansemond soil is moderately rapid, and available water capacity is low. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1-1/2 to 2-1/2 feet during winter and early spring.

Most areas of this soil are farmed. Some areas are in woodland, and a few are in pasture.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, increase water infiltration, and control erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, shortleaf pine, yellow-poplar, sweetgum, and oaks. Seeds and seedlings survive and grow well. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table, the moderately rapid permeability of the subsoil, and the sandy texture of the substratum are the main limitations of the soil for community development. The water table limits use of the soil as a building site or as a site for sanitary landfills or septic tank absorption fields. The permeability of the subsoil and the sandy substratum cause a contamination hazard to ground water and nearby streams in areas used for septic tanks or landfills. The sandy texture limits

excavation, and the surface of the soil is dusty when dry. The soil holds a low amount of moisture, which limits the growth of grasses and shrubs.

The capability subclass is IIe.

17—Pactolus loamy fine sand. This soil is deep, nearly level, and moderately well drained. It is on low ridges and along streams. Areas of this soil commonly are long and narrow. They range from about 3 to 100 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is gray loamy fine sand about 2 inches thick. The substratum is brown and gray loamy sand to a depth of at least 80 inches.

Included with this soil in mapping are small areas of well drained Alaga and Kalmia soils and somewhat poorly drained Dragston soils. The Alaga and Kalmia soils are on slightly higher areas throughout the map unit. The Dragston soils are in slight depressions and along drainageways. Included soils make up about 15 percent of the unit.

The permeability of this Pactolus soil is rapid, and available water capacity is low. Surface runoff is slow. The erosion hazard is slight. The surface layer is very friable and easily tilled through a wide range of moisture conditions. The substratum has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1-1/2 to 2-1/2 feet during winter and early spring.

Most areas of this soil are in woodland. Some areas are farmed.

This soil is moderately well suited to cultivated crops and to pasture and hay. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the low available water capacity. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and hold moisture in the soil.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing cuts the soft surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, sweetgum, and oaks. The survival of seeds and seedlings is hindered by drought during the growing season. The soil is soft when wet, limiting the use of heavy timber equipment.

Rapid permeability in the substratum, the seasonal high water table, and the sandy texture of the soil are the main limitations for community development. The rapid permeability and the water table cause a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields or sanitary landfills. The sandy texture limits excavation, and the surface of the soil is dusty when dry. The soil holds a low amount of moisture, which limits the growth of grasses and shrubs.

The capability subclass is IIIs.

18—Pungo muck. This soil is deep, nearly level, and very poorly drained. It is in the Dismal Swamp, mostly around Lake Drummond, and most of the acreage is in one large area. Slopes range from 0 to 1 percent.

Typically, the surface layer of this soil is black, well decomposed organic material about 6 inches thick. The subsurface layers extend to a depth of about 102 inches and consist of black, very dark brown, and dark reddish brown organic material that is well decomposed. The substratum is very dark gray silty clay.

Included with this soil in mapping are small areas of very poorly drained Belhaven and Deloss soils mostly along the edges of the map unit. Some areas of soils have water on the surface for long periods. Included soils make up about 15 percent of the unit.

The permeability of this Pungo soil is moderate, and available water capacity is high. Surface runoff is very slow. The erosion hazard is slight. The organic layers are extremely acid, and the underlying mineral layer ranges from extremely acid through strongly acid. The root zone is limited by the acidity of the soil and by a seasonal high water table that is within 12 inches of the surface from December through May of most years.

The seasonal high water table and the high content of organic material make this soil generally unsuitable for farming or most types of community development. Drainage makes this soil moderately well suited to farming, but drainage outlets are difficult to locate.

Most areas of this soil are wooded, but the potential productivity for trees is low. The common species are loblolly pine, pond pine, baldcypress, water tupelo, red maple, and Atlantic white-cedar. Seeds and seedlings are often smothered by dense undergrowth, and the soil will not support most types of heavy timber equipment.

The capability subclass is VIIw.

19—Rains fine sandy loam. This soil is deep, nearly level, and poorly drained. It is on low-lying upland flats and in depressions. Areas of this soil are irregularly rectangular or irregularly oval. They range from about 5 to 15 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is very dark grayish brown fine sandy loam about 6 inches thick. The subsoil extends to a depth of at least 65 inches. It is mostly gray loam and mottled sandy clay loam.

Included with this soil in mapping are small areas of moderately well drained Eunola and Nansemond soils and somewhat poorly drained Lynchburg soils that are on slightly higher areas throughout the map unit. Also included are areas of very poorly drained, sandy soils

and small areas that have water ponded on the surface. These are mainly near the center of the map unit or along drainageways. Included soils make up about 25 percent of the unit.

The permeability of this Rains soil is moderate, and available water capacity is high. Surface runoff is very slow. The erosion hazard is slight. The surface layer is friable and easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is between the surface and a depth of 1 foot during winter and spring.

Most areas of this soil are in woodland (fig. 3), but some drained areas are farmed.

If the soil is drained, it is moderately well suited to cultivated crops and to pasture and hay. Outlets, however, are often not available. The soil is wet and cold in spring, and wetness interferes with tillage. Undrained areas are not suitable for cultivated crops in most years (fig. 4).

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, and willow oak. Seeds and seedlings survive and grow well only if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment.

Figure 3.—A dugout pond in a wooded area of Rains fine sandy loam.

The seasonal high water table is the main limitation of the soil for community development, especially as a site for sanitary landfills or septic tanks. Many areas dry out slowly in spring and after heavy rains, limiting vehicular traffic on unpaved roads.

The capability subclass is IIIw if drained and IVw if undrained.

20A—Rumford loamy fine sand, 0 to 2 percent slopes. This soil is deep, nearly level, and well drained. It is on narrow upland ridges and is next to drainageways. Areas of this soil commonly are long and winding. They range from about 3 to 25 acres.

Typically, the surface layer of this soil is brown loamy fine sand about 10 inches thick. The subsurface layer is pale brown loamy fine sand 3 inches thick. The subsoil is mostly yellowish brown fine sandy loam 23 inches thick. The substratum is yellowish brown loamy sand to a depth of at least 72 inches.

Included with this soil in mapping are small areas of moderately well drained Nansemond soils, commonly in slight depressions throughout the map unit. These soils make up about 10 percent of the unit.

The permeability of this Rumford soil in moderately rapid, and the available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is strongly acid or medium acid, but reaction of the surface layer varies because of local liming practices.

Most areas of this soil are farmed. Some areas are in woodland, and some are in pasture.

This soil is well suited to cultivated crops and moderately well suited to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and hold moisture in the soil.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing cuts the soft surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, Virginia pine, and oaks. Seeds and seedlings survive and grow well.

The moderately rapid permeability of the subsoil, rapid permeability in the substratum, and the sandy texture of the surface layer are the main limitations of the soil for community development. The moderately rapid and rapid permeability causes a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields or sanitary landfills. The sandy texture

Figure 4.—Water on the surface limits farming in this area of Rains fine sandy loam.

limits excavation, and the surface of the soil is dusty when dry.

The capability class is I.

20B—Rumford loamy fine sand, 2 to 6 percent slopes. This soil is deep, gently sloping, and well drained. It is on side slopes next to drainageways. Areas of this soil commonly are long and winding. They range from about 3 to 25 acres.

Typically, the surface layer of this soil is brown loamy fine sand about 10 inches thick. The subsurface layer is pale brown loamy fine sand 3 inches thick. The subsoil is mostly yellowish brown fine sandy loam 23 inches thick. The substratum is yellowish brown loamy sand to a depth of at least 72 inches.

Included with this soil in mapping are small areas of moderately well drained Nansemond soils that are in slight depressions throughout the map unit. They make up about 5 percent of the unit.

The permeability of this Rumford soil is moderately rapid, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is strongly acid or medium acid, but reaction of the surface layer varies because of local liming practices.

Most areas of this soil are farmed, but some are in woodland.

This soil is well suited to cultivated crops and moderately well suited to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content, hold moisture in the soil, and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing cuts the soft surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, Virginia pine, and oaks. Seeds and seedlings survive and grow well.

The moderately rapid permeability of the subsoil, rapid permeability in the substratum, and the sandy texture of the surface layer are the main limitations of the soil for community development. The moderately rapid and rapid permeability cause a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields or sanitary landfills. The sandy texture limits excavation, and the surface of the soil is dusty when dry.

The capability subclass is IIe.

21A—State fine sandy loam, 0 to 2 percent slopes. This soil is deep, nearly level, and well drained. It is in long, narrow areas that commonly are at an elevation of less than 30 feet. They range from about 3 to 25 acres.

Typically, the surface layer of this soil is dark brown fine sandy loam about 10 inches thick. The subsurface layer is brown fine sandy loam 6 inches thick. The subsoil is mostly yellowish brown fine sandy loam and sandy clay loam 36 inches thick. The substratum extends to a depth of at least 65 inches. It is stratified brown loamy sand and fine sandy loam.

Included with this soil in mapping are small areas of moderately well drained Tetotum soils in slight depressions, at the heads of draingeways, and along small drainageways. These Tetotum soils make up about 5 percent of the unit.

The permeability of this State soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 4 to 6 feet during winter and spring.

Most areas of this soil are farmed, but some areas are in woodland.

This soil is very well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and reduces the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, yellow-poplar, sweetgum, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Rapid permeability in the substratum and the seasonal high water table are the main limitations of the soil for community development. Both cause a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields or sanitary landfills.

The capability class is I.

21B—State fine sandy loam, 2 to 6 percent slopes. This soil is deep, gently sloping, and well drained. It is in long, narrow areas commonly at an elevation of less than 30 feet. They range from about 3 to 25 acres.

Typically, the surface layer of this soil is dark brown fine sandy loam about 10 inches thick. The subsurface layer is brown fine sandy loam 6 inches thick. The subsoil is mostly yellowish brown fine sandy loam and sandy clay loam 36 inches thick. The substratum extends to a depth of at least 65 inches. It is stratified brown loamy sand and fine sandy loam.

Included with this soil in mapping are small areas of moderately well drained Tetotum soils in slight depressions, at the heads of draingeways, and along small drainageways. These Tetotum soils make up about 10 percent of the unit.

The permeability of this State soil is moderate, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 4 to 6 feet during winter and spring.

Most areas of this soil are farmed, but some areas are in woodland.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content, reduce crusting, increase water infiltration, and reduce erosion.

Establishing and maintaining a mixture of grasses and legumes and using proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and reduces the stand of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, yellow-poplar, sweetgum, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Rapid permeability in the substratum and the seasonal high water table are the main limitations of the soil for community development. Both cause a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields or sanitary landfills.

The capability subclass is IIe.

22A—Suffolk loamy sand, 0 to 2 percent slopes. This soil is deep, nearly level, and well drained. It is in long, narrow areas on broad uplands. The areas range from about 3 to 150 acres.

Typically, the surface layer of this soil is dark grayish brown loamy sand about 11 inches thick. The subsoil is mostly brown fine sandy loam and sandy clay loam 36 inches thick. The substratum is brown loamy fine sand to a depth of at least 65 inches.

Included with this soil in mapping are small areas of moderately well drained Eunola soils in slight depressions. They make up about 10 percent of the unit.

The permeability of this Suffolk soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices.

Most areas of this soil are farmed, but some areas are in woodland.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and reduces the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, Virginia pine, yellow-poplar, sweetgum, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Rapid permeability in the substratum of this soil is the main limitation for community development. The permeability causes a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields, sewage lagoons, or sanitary landfills.

The capability class is I.

22B—Suffolk loamy sand, 2 to 6 percent slopes. This soil is deep, gently sloping, and well drained. It is in long, narrow areas on broad uplands and side slopes next to drainageways. The areas range from about 3 to 150 acres.

Typically, the surface layer of this soil is dark grayish brown loamy sand about 11 inches thick. The subsoil is mostly brown fine sandy loam and sandy clay loam 36 inches thick. The substratum is brown loamy fine sand to a depth of at least 65 inches.

Included with this soil in mapping are small areas of moderately well drained Eunola soils in slight depressions. They make up about 10 percent of the unit.

The permeability of this Suffolk soil is moderate, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly ranges from extremely acid through strongly acid, but reaction of the surface layer varies because of local liming practices.

Most areas of this soil are farmed, but some are in woodland.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content, reduce crusting, increase water infiltration, and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and reduces the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, Virginia pine, yellow-poplar, sweetgum, and oaks. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Rapid permeability in the substratum of this soil is the main limitation for community development. The permeability causes a contamination hazard to ground water and nearby streams in areas used for septic tank absorption fields, sewage lagoons, or sanitary landfills.

The capability subclass is IIe.

23A—Tetotum fine sandy loam, 0 to 2 percent slopes. This soil is deep, nearly level, and moderately well drained. It is in long, narrow areas generally at an elevation of less than 30 feet. The areas range from about 3 to 100 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 11 inches thick. The subsoil is mostly brown and gray fine sandy loam, sandy clay loam, clay loam, and loam 54 inches thick. It has gray mottles at a depth of more than 29 inches. The substratum extends to a depth of at least 85 inches. It mostly is mottled, yellowish brown sandy loam.

Included with this soil in mapping are small areas of poorly drained Tomotley soils and well drained State soils. The Tomotley soils are in slight depressions, and the State soils are on slightly higher areas throughout the unit. Also included are small areas of soil with a firm layer in the lower part of the subsoil. Included soils make up about 15 percent of the unit.

The permeability of this Tetotum soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1-1/2 to 2-1/2 feet during winter and early spring.

Most areas of this soil are farmed. Some areas are in woodland, and a few are in pasture.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. The soil is wet and cold in the early spring. Drainage helps to alleviate spring wetness and protects crops from damage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, yellow-poplar, sweetgum, and oaks. Seed and seedlings survive and grow well. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table and the low strength of the soil are the main limitations for community development. The water table limits use of the soil as a building site or as a site for sanitary landfills or septic tank absorption fields. The soil needs a suitable base material to provide enough strength and stability to support vehicular traffic.

The capability subclass is IIw.

23B—Tetotum fine sandy loam, 2 to 6 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is in long, narrow areas generally at an elevation of less than 30 feet. The areas range from about 3 to 25 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 11 inches thick. The subsoil is mostly brown and gray fine sandy loam, sandy clay loam, clay loam, and loam 54 inches thick. It has gray mottles at a depth of more than 29 inches. The substratum extends to a depth of at least 85 inches. It mostly is mottled, yellowish brown sandy loam.

Included with this soil in mapping are small areas of well drained State soils and somewhat poorly drained Dragston soils. The State soils are on slightly higher areas throughout the map unit, and the Dragston soils are in slight depressions. Also included are small areas of soils with a firm layer in the lower part of the subsoil. Included soils make up about 10 percent of the unit.

The permeability of this Tetotum soil is moderate, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1-1/2 to 2-1/2 feet during winter and early spring.

Most areas of this soil are farmed. Some areas are in woodland, and a few are in pasture.

This soil is well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. The soil is wet and cold in the early spring. Drainage helps to alleviate spring wetness and protects crops from damage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, increase water infiltration, and control erosion.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is moderately high, especially for loblolly pine, yellow-poplar, sweetgum, and oaks. Seed and seedlings survive and grow well. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table and the low strength of the soil are the main limitions for community development. The water table limits use of the soil as a building site or as a site for sanitary landfills or septic

tank absorption fields. The soil needs a suitable base material to provide enough strength and stability to support vehicular traffic.

The capability subclass is IIe.

24—Tomotley loam. This soil is deep, nearly level, and poorly drained. It is on flats generally at an elevation of less than 30 feet, and large areas are near the Dismal Swamp. The areas of this soil commonly are irregularly oval or rectangular and range from about 3 to 100 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is dark gray loam about 7 inches thick. The subsoil is mostly gray sandy clay loam, clay loam, and loam 36 inches thick. The substratum is mostly light gray loamy fine sand to a depth of at least 61 inches.

Included with this soil im mapping are small areas of somewhat poorly drained Dragston soils and very poorly drained Deloss soils. The Dragston soils are on slightly higher areas, and the Deloss soils are in slight depressions throughout the unit. Water is ponded on the surface of some soils after heavy rains, during winter and spring, and during prolonged wet periods the rest of the year. Included soils make up about 15 percent of the unit.

The permeability of this Tomotley soil is moderate, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is moderate in organic matter content and low in natural fertility. It commonly is very strongly acid or strongly acid. A seasonal high water table is between the surface and a depth of 1 foot during winter and spring.

Most areas of this soil are in woodland, but a few areas are drained and farmed.

Unless the soil is drained, it is not suited to cultivated crops or hay and is poorly suited to pasture. Overgrazing when the soil is wet compacts the surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, water tupelo, and oaks. Seeds and seedlings survive and grow well only if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table is the main limitation of the soil for community development, especially as a building site, as a site for septic tank absorption fields or sanitary landfills, or for most types of recreation.

The capability subclass is IIIw if drained and IVw if undrained.

25—Torhunta loam. This soil is deep, nearly level, and very poorly drained. It is on flats along the northern and western parts of the Dismal Swamp and is in Briars Pocosin and other upland swamps. Areas of this soil commonly are irregularly oval or elongated. They range from about 3 to 1,000 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is very dark grayish brown loam about 16 inches thick. The subsoil is mostly grayish brown fine sandy loam about 14 inches thick. The substratum extends to a depth of at least 65 inches. It is mostly yellowish brown and dark greenish gray loamy sand and sandy loam.

Included with this soil in mapping are small areas of soils that have a mucky surface layer. These soils are throughout the map unit and make up about 10 percent of the unit.

The permeability of this Torhunta soil is moderately rapid, and available water capacity is moderate. Surface runoff is very slow. The erosion hazard is slight. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is moderate in organic matter content and low in natural fertility. It commonly ranges from extremely acid through strongly acid. The soil is frequently flooded. Water is ponded on the surface for long periods during the winter and spring and after heavy rains and during prolonged wet periods throughout the rest of the year. A seasonal high water table is between the surface and a depth of 1-1/2 feet during the winter and spring.

This soil is not suited to cultivated crops or to hay or pasture unless it is drained and protected from flooding. Overgrazing when the soil is wet compacts the surface layer and damages the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, water tupelo, and sweetgum. Most areas are wooded. Seeds and seedlings survive and grow well only if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table, ponding, and flooding are the main limitations of the soil for community development, especially as a building site, as a site for septic tank absorption fields or sanitary landfills, and for many types of recreation.

The capability subclass is IIIw if drained and VIw if undrained.

26—Udorthents, loamy. This unit consists of soils that have been disturbed during grading for roads, housing developments, and other similar uses. The areas range from about 2 to 50 acres. Slopes range from 0 to 50 percent.

Included with this unit in mapping are small areas of undisturbed soils, sanitary landfills, and sand and clay pits. Included areas make up about 30 percent of this unit.

The permeability is moderate to slow in this map unit. Runoff and internal drainage are variable. The available water capacity is generally low or moderate, and the hazard of erosion is moderate or high. The material ranges from very strongly acid through medium acid.

The properties of the soils in this map unit are extremely variable, and onsite investigation is needed to determine the suitability and limitations of the unit for any use.

The capability subclass is unassigned.

27—Urban land. This map unit consists of areas where more than 85 percent of the surface is covered by asphalt, concrete, buildings, or other impervious surfaces. Examples are parking lots, shopping centers, and industrial parks. These areas are throughout the survey area, but the largest are near downtown business districts and along main roads. The areas range from about 2 to 100 acres. Slopes range from 0 to 15 percent.

Included with this unit in mapping are areas of undisturbed soils, commonly moderately well drained Dogue soils that are between streets and sidewalks, in yards, and in traffic islands and circles. These areas generally are less than 500 square feet. They make up about 10 percent of the unit.

Onsite investigation is needed to determine the suitability and limitations of this unit for any use.

The capability subclass is unassigned.

28—Wahee silt loam. This soil is deep, nearly level, and somewhat poorly drained. It is on narrow to broad areas near drainageways and along the outer rim of broad upland swamps. Areas of this soil commonly are elongated or irregularly oval and range from about 3 to 50 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is very dark grayish brown and pale brown silt loam about 4 inches thick. The subsoil is mottled and extends to a depth of at least 62 inches. It is mostly light yellowish brown clay loam and silty clay in the upper part and light gray silty clay, silty clay loam, and fine sandy loam in the lower part.

Included with this soil in mapping are small areas of well drained Emporia soils, moderately well drained Dogue soils, and poorly drained Tomotley soils. The Emporia and Dogue soils are on slightly higher areas throughout the map unit, and the Tomotley soils are around small drainageways and in depressions. Also included are areas of soils that are similar to this Wahee soil but that have a thinner subsoil; these soils are generally at an elevation of less than 30 feet. Included soils make up about 15 percent of this unit.

The permeability of this Wahee soil is slow, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1/2 foot to 1-1/2 feet during winter and spring.

Most areas of this soil are farmed, but some areas are in woodland.

This soil is moderately well suited to cultivated crops and to pasture and hay. Crops respond well to lime and fertilizer. The soil is wet and cold in spring, and wetness often interferes with tillage. Drainage helps to alleviate wetness and protects crops from damage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sweetgum, yellow-poplar, sycamore, and oaks. Seeds and seedlings survive and grow well only if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table and the clayey texture and slow permeability of the subsoil are the main limitations of the soil for community development. They especially limit use of the soil as a building site or as a site for sanitary landfills or septic tank absorption fields.

The capability subclass is IIIw.

29—Weston fine sandy loam. This soil is deep, nearly level, and poorly drained. It is on broad flats mostly along the northern part of the Dismal Swamp. Areas of this soil commonly are elongated and range from about 3 to 400 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer of this soil is very dark gray fine sandy loam about 8 inches thick. The subsoil is mostly grayish brown and gray loam and fine sandy loam 31 inches thick. The substratum extends to a depth of at least 62 inches. It is mostly yellowish brown and white loamy sand and sand with many white and gray mottles.

Included with this soil in mapping are moderately well drained Nansemond soils in small, slightly higher areas throughout the unit. They make up about 10 percent of the unit.

The permeability of this Weston soil is moderately slow, and available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable and easily tilled. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It commonly is very strongly acid or strongly acid, but reaction of the surface layer varies because of local liming practices. A seasonal high water table is between the surface and a depth of 1 foot during winter and spring.

Most areas of this soil are in woodland, but some areas have been drained and are farmed.

Drained areas of this soil are moderately well suited to cultivated crops or to pasture and hay. Crops respond

well to lime and fertilizer. The soil is wet and cold in spring, and wetness often interferes with tillage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes and the use of proper stocking rates, pasture rotation, deferred grazing, drainage, and lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage the stands of grasses and legumes.

The potential productivity for trees on this soil is high, especially for loblolly pine, sycamore, yellow-poplar, sweetgum, and oaks. Seeds and seedlings survive and grow well only if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table and the sandy texture of the substratum are the main limitations of the soil for community development. The water table limits use of the soil as a building site, as a site for sanitary landfills or septic tank absorption fields, and for many types of recreation. The water table and the instability of the substratum limit excavations.

The capability subclass is IIIw.

prime farmland

Prime farmland is one of several kinds of important farmlands defined by the U. S. Department of Agriculture. It is of major importance in providing the nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U. S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land, but not urban and built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has favorable temperature and growing season and acceptable levels of acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope ranges mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland consult the local staff of the Soil Conservation Service.

About 164,690 acres, or nearly 60 percent, of the City of Suffolk meets the soil requirements for prime farmland. Areas are in all parts of the survey area except for the Dismal Swamp.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmlands to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and difficult to cultivate, and usually less productive.

Soil map units that make up prime farmland in the City of Suffolk are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in the table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section 'Detailed soil map units.

Soils that have limitations—a high water table, flooding, or inadequate rainfall—may qualify for prime farmland if these limitations are overcome by such measures as drainage, flood control, or irrigation. In the following list, the measures needed to overcome the limitations, if any, are shown in parentheses after the map unit name. Onsite evaluation is necessary to see if these limitations have been overcome by corrective measures.

The map units that meet the soil requirements for prime farmland are:

5A Dogue fine sandy loam, 0 to 2 percent slopes
5B2 Dogue fine sandy loam, 2 to 6 percent slopes, eroded
6 Dragston fine sandy loam (if artificially drained and drainage is maintained)
7A Emporia fine sandy loam, 0 to 2 percent slopes
7B2 Emporia fine sandy loam, 2 to 6 percent slopes, eroded
8A Eunola loamy fine sand, 0 to 2 percent slopes
8B Eunola loamy fine sand, 2 to 6 percent slopes
9A Goldsboro fine sandy loam, 0 to 2 percent slopes
9B2 Goldsboro fine sandy loam, 2 to 5 percent slopes, eroded
10A Kalmia fine sandy loam, wet substratum, 0 to 2 percent slopes
10B Kalmia fine sandy loam, wet substratum, 2 to 6 percent slopes
14 Lynchburg fine sandy loam (if artificially drained and drainage is maintained)
15B Nansemond loamy fine sand, 0 to 6 percent slopes

16A Nansemond fine sandy loam, 0 to 2 percent slopes
16B Nansemond fine sandy loam, 2 to 6 percent slopes
19 Rains fine sandy loam (if artificially drained and drainage is maintained)
20A Rumford loamy fine sand, 0 to 2 percent slopes
20B Rumford loamy fine sand, 2 to 6 percent slopes
21A State fine sandy loam, 0 to 2 percent slopes
21B State fine sandy loam, 2 to 6 percent slopes
22A Suffolk loamy sand, 0 to 2 percent slopes
22B Suffolk loamy sand, 2 to 6 percent slopes
23A Tetotum fine sandy loam, 0 to 2 percent slopes
23B Tetotum fine sandy loam, 2 to 6 percent slopes
24 Tomotley loam (if artificially drained and drainage is maintained)
28 Wahee silt loam (if artificially drained and drainage is maintained)
29 Weston fine sandy loam (if artificially drained and drainage is maintained)

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

This section explains the system of land capability classification used by the Soil Conservation Service and lists the estimated yields of the main crops and hay and pasture plants in the survey area.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Most of the soils in the survey area have a high level of acidity and a low level of plant nutrients. As a result, the crops and pasture plants on most of the soils need and respond to applications of lime and fertilizer.

Excessive tillage of the soil lowers the infiltration rate of water and air and causes less favorable tilth in the seedbed. Confining tillage to periods in which the soil has optimum moisture content helps to prevent the formation of clods or the conditions leading to crusting of the surface layer. Restricted tillage is especially important on an eroded soil, such as Emporia fine sandy loam, 2 to 6 percent slopes, eroded, because the plow layer of such a soil has more clay than does the plow layer of similar uneroded soils.

Soils in capability subclasses IIe, IVe, and VIe (see the section "Land capability classification") are especially susceptible to water erosion. Methods used to help control such erosion include contour stripcropping, minimum tillage, planting permanent grass, and using grass or close-growing crops in the crop rotation.

Excess soil wetness is at least a seasonal problem in soils in capability subclasses IIw, IIIw, IVw, VIw, VIIw, and VIIIw. The soils in IIw, IIIw, and IVw can usually be drained by surface ditches, tile drains, or a combination of the two; the lack of or difficulty in locating suitable drainage outlets makes it impractical to drain the soils in VIw, VIIw, and VIIIw.

Capability subclass IIs and IIIs comprise soils that are sandy and that have low available water capacity. Such soils are droughty during the growing season, but crops on these soils generally respond well to irrigation.

Wind erosion commonly is a hazard on soils in which the texture of the surface layer is loamy fine sand or loamy sand. Eunola loamy fine sand and Suffolk loamy sand are examples of soils in the survey area that are susceptible to wind erosion if they are not protected by vegetation.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and

results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Woodland covers about 58 percent, or 160,855 acres, of the survey area. The wooded areas are mostly second-growth hardwoods and pines and planted loblolly pine. The dominant species are white oak, southern red oak, hickory, sweetgum, yellow-poplar, red maple, water tupelo, baldcypress, Atlantic white-cedar, loblolly pine, and Virginia pine. Loblolly pine is the best suited and fastest growing tree for many of the soils. Atlantic white-cedar, water tupelo, baldcypress, and red maple are dominant in the Dismal Swamp.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w*, indicates excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, d, c, s, and r.

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that a few trees may be blown down by normal winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

recreation

The soils of the survey area are rated in table 7 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The

surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

wildlife habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and beaver.

engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family

dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

sanitary facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can cause construction problems.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

construction materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less

than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the soil layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope and wetness affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5

percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

soil and water features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped

according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table K are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*5*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 16, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquult (*Aqu*, meaning water, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Ochraquults (*Ochr*, meaning pale epipedon, plus *aquult*, the suborder of the Ultisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Ochraquults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, thermic Typic Ochraquults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*4*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*5*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Alaga series

Soils of the Alaga series are deep and well drained. They formed in sandy fluvial and marine sediments. Alaga soils are on low-lying terrace knolls and ridges on the Coastal Plain. Slopes range from 2 to 8 percent.

Alaga soils commonly are near Kenansville, Pactolus, and Suffolk soils. Alaga soils have more sand than Kenansville or Suffolk soils and are not as poorly drained as Pactolus soils.

Typical pedon of Alaga loamy sand, wet substratum, 2 to 8 percent slopes, about 1 mile southwest of South Quay, 100 yards southwest of the end of VA-747:

Ap—0 to 9 inches; dark brown (10YR 3/3) loamy sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt wavy boundary.

C1—9 to 22 inches; brownish yellow (10YR 6/6) loamy sand; single grain; loose; common fine roots; common coatings of iron and organic matter on sand grains; strongly acid; diffuse smooth boundary.

C2—22 to 46 inches; yellow (10YR 7/6) loamy sand; common medium faint brownish yellow (10YR 6/6) mottles; single grain; loose; common fine roots; common uncoated white (10YR 8/2) sand grains; common oxide coatings on sand grains; medium acid; diffuse smooth boundary.

C3—46 to 80 inches; very pale brown (10YR 8/3) sand; few fine distinct brownish yellow (10YR 6/6) mottles; single grain; loose; common fine roots; common uncoated white (10YR 8/2) sand grains; common oxide coatings on sand grains; medium acid.

The thickness of the sandy horizons is more than 80 inches. The soil ranges from very strongly acid through medium acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. It is sand, loamy sand, or loamy fine sand.

The C horizon has hue of 7.5YR or 10YR, value of 5 through 8, and chroma of 3 through 6. It is sand, loamy sand, or loamy fine sand. White (10YR 8/2) uncoated sand grains commonly are in lenses at a depth of more than 20 inches.

Belhaven series

Soils of the Belhaven series are deep and very poorly drained. The soils formed in well decomposed plant remains and underlying loamy mineral sediments of marine origin. Belhaven soils are in the Dismal Swamp. Slopes range from 0 to 1 percent.

Belhaven soils commonly are near Deloss and Pungo soils. Belhaven soils have an organic surface layer which is not characteristic of the Deloss soils. They have a thinner organic layer than the Pungo soils.

Typical pedon of Belhaven muck, approximately 1.2 miles north of the intersection of VA-678 and VA-604 and 0.6 mile east of VA-604:

Oa1—0 to 9 inches; black (5YR 2/1 broken face and rubbed) muck (sapric material); 1 percent rubbed fibers; moderate medium granular and subangular blocky structure; friable, slightly sticky, nonplastic; many fine medium and coarse roots; extremely acid; clear smooth boundary.

Oa2—9 to 20 inches; black (5YR 2/1 broken face and rubbed) muck (sapric material); less than 1 percent rubbed fiber; moderate medium and coarse subangular blocky structure; friable, slightly sticky, nonplastic; many fine medium and coarse roots; few fragments of wood; extremely acid; gradual smooth boundary.

Oa3—20 to 32 inches; dark reddish brown (5YR 2/2, broken face and rubbed) muck (sapric material); less than 1 percent rubbed fiber; massive; friable, slightly sticky, nonplastic; many fine medium and coarse roots; common stumps, logs, and fragments of wood; extremely acid; gradual smooth boundary.

Oa4—32 to 44 inches; black (10YR 2/1, broken face and rubbed) muck (sapric material); less than 1 percent rubbed fiber; massive; friable, slightly sticky, nonplastic; few medium roots; common stumps and logs; extremely acid; clear wavy boundary.

IICg—44 to 62 inches; very dark gray (N 3/0) silty clay loam; massive; firm, slightly sticky, slightly plastic; few medium roots; extremely acid.

The thickness of the organic soil material ranges from 16 to 51 inches. The soil is extremely acid in the organic layer and extremely acid through strongly acid in the underlying mineral layer. The surface layer, by volume, is 0 to 2 percent logs, stumps, and fragments of wood, and the subsurface layer is 5 to 25 percent.

The Oa layer has hue of 10YR or 5YR, value of 2 or 3, and chroma of 1 or 2. It is 30 to 80 percent organic material.

The IICg horizon is gray (N 3/0 to N 5/0) silty clay loam or silt loam.

Bohicket series

Soils of the Bohicket series are deep and very poorly drained. They formed in loamy and clayey estuarine and tidal sediments. Bohicket soils are in marshes along the Nansemond River and, to a lesser extent, along Hampton Roads and smaller tributaries of the lower Coastal Plain. Slopes range from 0 to 1 percent.

Bohicket soils commonly are near Kenansville, Nansemond, Pactolus, and State soils. Bohicket soils are much more poorly drained than any of these soils.

Typical pedon of Bohicket silty clay loam, approximately 2,000 feet north of US-58 bypass from a point 1,300 feet west of its intersection with VA-642:

A1g—0 to 13 inches; very dark grayish brown (2.5Y 3/2) silty clay loam; massive; slightly sticky, slightly plastic; many fine and medium roots; flows between the fingers easily when squeezed; neutral; gradual wavy boundary.

C1g—13 to 30 inches; dark olive gray (5Y 3/2) silty clay; massive; sticky, slightly plastic; few fine roots; flows between the fingers very easily when squeezed; strong sulfur odor; mildly alkaline; gradual wavy boundary.

C2g—30 to 60 inches; dark greenish gray (5GY 4/1) silty clay; massive; sticky, plastic; flows between the fingers very easily when squeezed; moderate sulfur odor; moderately alkaline.

The soil ranges from neutral through moderately alkaline.

The A horizon has hue of 10YR through 5Y or is neutral, value of 2 through 4, and chroma of 0 through 2. It is silty clay loam.

The C horizon has hue of 10YR through 5Y and 5GY, value of 3 or 4, and chroma of 1 or 2. It is silty clay.

Deloss series

Soils of the Deloss series are deep and very poorly drained. They formed in loamy fluvial and marine sediments. Deloss soils are on broad flats primarily along the perimeter of the Dismal Swamp. Slopes range from 0 to 2 percent.

Deloss soils commonly are near Belhaven, Tomotley, and Torhunta soils. Deloss soils have a mineral surface layer, whereas Belhaven soils have an organic surface layer. The Deloss soils have a surface layer that is higher in organic matter content than that in the Tomotley soils and a subsoil that has more clay than that in the Torhunta soils.

Typical pedon of Deloss mucky loam, approximately 1 mile west of the intersection of US-58 and the Chesapeake City line, 140 feet north of US-58:

A1—0 to 10 inches; very dark gray (10YR 3/1) mucky loam; moderate and strong coarse granular structure; very friable, nonsticky, nonplastic; common fine medium and coarse roots; strongly acid; abrupt wavy boundary.

A2—10 to 17 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium roots; strongly acid; gradual wavy boundary.

B2tg—17 to 31 inches; gray (10YR 5/1) sandy clay loam; common medium prominent red (2.5YR 4/6) mottles; moderate coarse subangular blocky structure; firm, sticky, slightly plastic; few fine roots; very strongly acid; gradual irregular boundary.

B31g—31 to 39 inches; dark gray (10YR 4/1) fine sandy loam; few medium prominent red (2.5YR 4/8) and dark red (2.5YR 3/6) mottles; weak very coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; strongly acid; abrupt irregular boundary.

B32g—39 to 60 inches; light gray (10YR 6/1) fine sandy loam; many coarse distinct brownish yellow (10YR 6/8) mottles; moderate very coarse subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; few fine prominent dark red (2.5YR 3/6) oxide concretions; strongly acid; abrupt smooth boundary.

Cg—60 to 75 inches; greenish gray (5GY 6/1) stratified loam and fine sandy loam; few medium prominent red (2.5YR 4/8) mottles; massive; friable, slightly sticky, nonplastic; few fine roots; common fine flakes of mica; neutral.

The solum thickness ranges from 40 to 60 inches. In unlimed areas the soil is very strongly acid or strongly acid in the A and B horizons and ranges from extremely acid through neutral in the C horizon.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is mucky loam or mucky fine sandy loam. The A2 horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2. It is loam or fine sandy loam.

The B horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 or 2. It commonly has high chroma mottles. The B horizon is sandy clay loam or fine sandy loam.

The C horizon has hue of 10YR through 5Y and 5GY or is neutral, value of 5 through 7, and chroma of 0 through 2. It commonly has high-chroma mottles. The C horizon is stratified and ranges from fine sand to sandy clay loam.

Dogue series

Soils of the Dogue series are deep and moderately well drained. They formed in clayey marine and fluvial sediments. Dogue soils are on low ridges and are on terraces along major streams and rivers. Slopes range from 0 to 6 percent.

Dogue soils commonly are near Emporia, Eunola, Goldsboro, Lynchburg, Suffolk, and Wahee soils. Dogue soils have more clay in the subsoil than Emporia or Suffolk soils and are not as well drained. They have more clay in the subsoil than Eunola or Goldsboro soils and are not as poorly drained as Lynchburg or Wahee soils.

Typical pedon of Dogue fine sandy loam, 0 to 2 percent slopes, 0.63 mile north of the intersection of VA-642 and VA-674, 825 feet west of VA-642:

Ap—0 to 6 inches; light brownish gray (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

A2—6 to 16 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine and medium granular structure; very friable; few medium roots; very strongly acid; clear smooth boundary.

B21t—16 to 24 inches; yellowish brown (10YR 5/6) clay loam; few fine faint yellowish red (5YR 5/6) mottles; moderate medium angular blocky structure; firm, slightly sticky, slightly plastic; few medium roots; thin discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22t—24 to 41 inches; yellowish brown (10YR 5/6) sandy clay; many fine distinct red (2.5YR 4/8) and gray (10YR 6/1) mottles; strong medium and coarse angular blocky structure; firm, slightly sticky, slightly plastic; thin discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

B23t—41 to 55 inches; brownish yellow (10YR 6/8) sandy clay loam; many fine distinct gray (10YR 6/1)

mottles and common medium prominent dark red (10R 3/6) mottles; strong medium and coarse subangular blocky structure; firm, slightly sticky, slightly plastic; thin continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; gradual wavy boundary.

B3—55 to 63 inches; light gray (10YR 7/1) sandy clay loam; common coarse distinct dark yellowish brown (10YR 4/4) mottles, common medium prominent light red (10R 6/8) mottles, few medium prominent red (2.5YR 5/8) mottles, and few coarse prominent reddish yellow (7.5YR 6/8) mottles; weak very coarse subangular blocky structure; friable, slightly sticky, slightly plastic; very strongly acid.

The solum thickness ranges from 50 to 60 inches or more. The soil is very strongly acid or strongly acid unless limed.

The A1 or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. The A2 horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 4 through 6. The A horizon is fine sandy loam or loam.

The upper part of the B2t horizon has hue of 10YR, value of 5 or 6, and chroma of 6 through 8. The lower part of the B2t horizon has similar matrix colors and has low and high chroma mottles. The B2t horizon is clay loam, sandy clay loam, sandy clay, or clay.

The B3 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. It commonly has high and low chroma mottles. It is sandy loam or sandy clay loam.

Dragston series

Soils of the Dragston series are deep and somewhat poorly drained. They formed in loamy fluvial and marine sediments. Dragston soils are along the edges of upland swamps and on broad, level uplands between drainageways. Slopes range from 0 to 2 percent.

Dragston soils commonly are near Eunola, Nansemond, Tetotum, Tomotley, and Weston soils. Dragston soils are more poorly drained than Eunola, Nansemond, or Tetotum soils, and they have less clay in the subsoil than Eunola or Tetotum soils. They are not as poorly drained as Tomotley or Weston soils.

Typical pedon of Dragston fine sandy loam, approximately 90 yards east of VA-624, from a point 1.07 miles north of its intersection with VA-658:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; very friable; many fine roots; many fine pores; strongly acid; abrupt smooth boundary.

B21t—9 to 17 inches; light olive brown (2.5Y 5/4) fine sandy loam; common medium distinct yellowish brown (10YR 5/8) mottles and few fine faint grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine pores; few thin very patchy clay films on faces of peds; clay bridging between sand grains; very strongly acid; clear wavy boundary.

B22tg—17 to 28 inches; grayish brown (2.5Y 5/2) fine sandy loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few thin very patchy clay films on faces of peds; clay bridging between sand grains; very strongly acid; gradual wavy boundary.

B3g—28 to 37 inches; grayish brown (10YR 5/2) fine sandy loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak very coarse subangular blocky structure; very friable; nonsticky, nonplastic; very strongly acid; gradual wavy boundary.

C—37 to 66 inches; brownish yellow (10YR 6/8) fine sand; few coarse distinct light brownish gray (10YR 6/2) mottles; single grain; loose; very strongly acid.

The solum thickness ranges from 30 to 40 inches. The soil is very strongly acid or strongly acid unless limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 through 4. It is fine sandy loam or sandy loam.

The B2t and B3 horizons have hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 6. The B2t horizon commonly has mottles of high and low chroma. The B2t horizon is fine sandy loam, loam, or sandy clay loam. The B3 horizon is fine sandy loam or loamy fine sand.

The C horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 2 through 8. It commonly has mottles of high and low chroma. It is fine sand or loamy fine sandy.

Emporia series

Soils of the Emporia series are deep and well drained. They formed in stratified loamy and clayey fluvial and marine sediments. Emporia soils are on uplands and side slopes adjacent to major drainageways on the Coastal Plain. Slopes range from 0 to 6 percent.

Emporia soils commonly are near Dogue, Goldsboro, and Pactolus soils. Emporia soils are not as poorly drained as any of these soils. In addition, they have less clay in the subsoil than Dogue soils and less sand than Pactolus soils.

Typical pedon of Emporia fine sandy loam, 0 to 2 percent slopes, approximately 1 mile southwest of Whaleyville, 1,020 feet southwest of the intersection of VA-672 and US-13 and 200 feet northwest of US-13:

Ap—0 to 10 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; few fine pores; slightly acid; abrupt smooth boundary.

B21t—10 to 16 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky

structure; friable, sticky, slightly plastic; many fine roots; many fine and medium pores; few thin clay films in pores; clay bridging between sand grains; very strongly acid; gradual wavy boundary.

B22t—16 to 24 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common fine and medium tubular pores; few thin clay films on faces of peds and in pores; very strongly acid; clear wavy boundary.

B23t—24 to 35 inches; yellowish brown (10YR 5/8) sandy clay loam; few fine distinct red (2.5R 4/8) mottles and few medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common fine and medium pores; thin discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

B24t—35 to 41 inches; brownish yellow (10YR 6/6) clay loam; common medium prominent red (10R 4/6) mottles, common fine distinct light gray (10YR 7/1) mottles, and many fine faint reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium tubular pores; few thin discontinuous clay films on faces of peds and in pores; very strongly acid; clear wavy boundary.

B25t—41 to 60 inches; mottled gray (N 6/0), light brownish gray (10YR 6/2), strong brown (7.5YR 5/6), and red (10R 4/8) clay; weak coarse prismatic structure; firm, sticky, plastic; many root fossils in cracks between peds; thin continuous clay films on faces of peds; very strongly acid; clear wavy boundary.

B3t—60 to 72 inches; mottled red (10R 4/8), gray (N 6/0), and strong brown (7.5YR 5/8) sandy clay loam; moderate coarse subangular blocky structure; friable, slightly sticky, slightly plastic; common coarse vertical tubular pores; thin brown (7.5YR 5/4) clay films in pores and on faces of peds; very strongly acid.

The solum thickness ranges from 50 to 75 inches. The soil is very strongly acid or strongly acid unless limed.

The A horizon has hue of 10YR, value of 4 through 6, and chroma of 3 or 4.

The upper part of the B2t horizon has matrix hue of 5YR through 10YR, value of 4 through 6, and chroma of 6 or 8. The lower part of the Bt horizon commonly is mottled and has hue of 5YR through 2.5Y or is neutral, value of 4 through 8, and chroma of 0 through 8. The Bt horizon is fine sandy loam, sandy clay loam, or clay loam but ranges to clay in the lower part.

Eunola series

Soils of the Eunola series are deep and moderately well drained. They formed in loamy marine and fluvial sediments. Eunola soils are on narrow to broad ridges and side slopes. Slopes range from 0 to 6 percent.

Eunola soils commonly are near Goldsboro, Lynchburg, Nansemond, and Suffolk soils. Eunola soils have less silt and generally have a thinner subsoil than Goldsboro soils. They are not as poorly drained as Lynchburg soils, have more clay in the subsoil than Nansemond soils, and are not as well drained as Suffolk soils.

Typical pedon of Eunola loamy fine sand, 0 to 2 percent slopes, 0.75 mile northeast of Liberty Spring Church near US-13, 100 yards north of Cypress Swamp:

Ap—0 to 9 inches; grayish brown (10YR 5/2) loamy fine sand; weak fine granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.

B21t—9 to 18 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium and fine subangular blocky structure; friable, nonsticky, nonplastic; common fine roots; common silt and clay bridging of sand grains and few skeletans; strongly acid; clear smooth boundary.

B22t—18 to 28 inches; yellowish brown (10YR 5/6) sandy clay loam; few fine faint light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; common clay bridging between sand grains; strongly acid; clear wavy boundary.

B23t—28 to 45 inches; strong brown (7.5YR 5/6) sandy clay loam; many medium distinct grayish brown (10YR 5/2) mottles and common fine distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; common clay and silt bridging between sand grains; very strongly acid; diffuse wavy boundary.

B3g—45 to 63 inches; grayish brown (10YR 5/2) fine sandy loam; many coarse distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable, nonsticky, nonplastic; pockets of reddish yellow (7.5YR 6/8) sandy clay loam and grayish brown (10YR 5/2) sand; common silt and clay bridging of sand grains in sandy clay loam pockets; very strongly acid.

The solum thickness ranges from 40 to 60 inches or more. The soil is very strongly acid or strongly acid unless limed.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. It is loamy fine sandy.

The B2t horizon and the B3 horizon have matrix hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4

through 8. The lower part of the B2t horizon and the B3 horizon have high- and low-chroma mottles. The B2t horizon is fine sandy loam or sandy clay loam. The B3 horizon is fine sandy loam or sandy loam.

Goldsboro series

Soils of the Goldsboro series are deep and moderately well drained. They formed in loamy marine and fluvial sediments. Goldsboro soils are on broad uplands on the Coastal Plain. Slopes range from 0 to 5 percent.

The Goldsboro soils in this survey area are a taxadjunct because the subsoil has more silt and is firmer in the lower part than is defined in the range for the series. These differences do not affect the use and management of the soils.

Goldsboro soils commonly are near Eunola, Lynchburg, Rains, Suffolk, and Wahee soils. Goldsboro soils have a higher silt content and generally have a thicker subsoil than Eunola soils. Goldsboro soils are better drained than Lynchburg or Rains soils, have a thicker solum than and are not as well drained as Suffolk soils, and have less clay in the subsoil than Wahee soils.

Typical pedon of Goldsboro fine sandy loam, 0 to 2 percent slopes, 0.5 mile southwest of the intersection of US-13 and VA-672, 200 feet northwest of US-13:

Ap—0 to 13 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary.

A2—13 to 18 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; weak medium granular structure; friable, slightly sticky, nonplastic; few fine roots; many fine and medium pores; slightly acid; clear wavy boundary.

B1t—18 to 26 inches; brownish yellow (10YR 6/6) loam; weak fine subangular blocky structure; friable, sticky, slightly plastic; few fine roots; many fine and medium pores; strongly acid; clear wavy boundary.

B21t—26 to 31 inches; light yellowish brown (2.5Y 6/4) loam; common coarse distinct strong brown (7.5YR 5/8), brownish yellow (10YR 6/6), and light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable, sticky, slightly plastic; many fine and medium pores; few thin clay films on faces of peds; strongly acid; clear wavy boundary.

B22t—31 to 38 inches; brownish yellow (10YR 6/6) sandy clay loam; many medium distinct gray (10YR 6/1), light yellowish brown (2.5Y 6/4), and yellowish red (5YR 5/8) mottles; moderate coarse subangular blocky structure parting to weak thin platy; firm in place, friable removed; sticky, slightly plastic; common fine and medium pores; few thin clay films on faces of peds; strongly acid; gradual wavy boundary.

B23t—38 to 57 inches; strong brown (7.5YR 5/6) sandy clay loam; many coarse prominent gray (10YR 6/1), yellowish red (5YR 5/8), and pale brown (10YR 6/3) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm, sticky, plastic; few fine pores; few thin clay films on faces of peds; strongly acid; diffuse wavy boundary.

B24t—57 to 70 inches; strong brown (7.5YR 5/6) sandy clay loam; many medium distinct gray (10YR 6/1) and dark red (10R 3/6) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm, sticky, plastic; thin continuous clay films on faces of peds; very strongly acid.

The solum thickness ranges from 60 to 80 inches or more. The soil is very strongly acid or strongly acid unless limed.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is fine sandy loam.

The B2t horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 8; or hue of 7.5YR, value of 5, and chroma of 6 or 8. The B2t horizon commonly has mottles of lower and higher chroma below a depth of about 24 inches. The horizon is loam or sandy clay loam. The lower part of the B2t horizon is firm in place.

Kalmia series

Soils of the Kalmia series are deep and well drained. They formed in loamy fluvial and marine sediments and underlying sandy sediments. Kalmia soils are on uplands and stream terraces on the Coastal Plain. Slopes range from 0 to 6 percent.

Kalmia soils in this survey area are a taxadjunct because the surface layer is thicker than is defined in the range for the series. This does not affect the use and management of the soils.

Kalmia soils commonly are near Kenansville, Nansemond, and Suffolk soils. Kalmia soils do not have the thick, sandy surface layer characteristic of Kenansville soils. Kalmia soils are better drained than Nansemond soils and have a contrasting sandy layer in the substratum that is not characteristic of Suffolk soils.

Typical pedon of Kalmia fine sandy loam, wet substratum, 0 to 2 percent slopes, 0.95 mile north of US-17 on VA-626, 1,300 feet east of VA-626:

A1—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine medium and coarse roots; many uncoated sand grains; very strongly acid; clear smooth boundary.

A21—4 to 13 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine and medium roots; very strongly acid; clear wavy boundary.

A22—13 to 22 inches; light gray (2.5Y 7/2) fine sandy loam; weak fine granular structure; very friable,

nonsticky, nonplastic; common fine and medium roots; very strongly acid; clear smooth boundary.

B2t—22 to 34 inches; dark yellowish brown (10YR 4/4) sandy clay loam; moderate fine and medium subangular blocky structure; friable, nonsticky, nonplastic; common fine roots; many thin clay films on faces of peds; strongly acid; abrupt smooth boundary.

IIC1—34 to 45 inches; light yellowish brown (2.5Y 6/4) loamy fine sand; single grain; loose; common fine roots; very strongly acid; clear smooth boundary.

IIC2—45 to 72 inches; brownish yellow (10YR 6/8) fine sandy loam; massive; very friable; nonsticky, nonplastic; common fine roots; very strongly acid.

The solum thickness ranges from 25 to 40 inches. The soil is very strongly acid or strongly acid unless limed.

The A1 or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The A2 horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 2 through 4. The A horizon is fine sandy loam or sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. It is sandy clay loam.

The IIC horizon is stratified sand and loamy sand and has fine sandy loam in some layers below 40 inches.

Kenansville series

Soils of the Kenansville series are deep and well drained. They formed in loamy marine and fluvial sediments. Kenansville soils are on knolls and ridges on the Coastal Plain. Slopes range from 0 to 4 percent.

Kenansville soils commonly are near Alaga, Eunola, Lynchburg, Nansemond, and Suffolk soils. Kenansville soils have more clay in the subsoil than Alaga soils. They are better drained and have a thicker, sandier surface layer than Eunola, Lynchburg, or Nansemond soils. They have a thicker, sandier surface layer than Suffolk soils.

Typical pedon of Kenansville loamy sand, 0 to 4 percent slopes, 1 mile west of Bethlehem Church on US-58, 0.2 mile south of US-58 and 100 yards north of Speights Run Lake:

A1—0 to 3 inches; dark grayish brown (10YR 4/2) loamy sand; weak medium granular structure; very friable; strongly acid; abrupt wavy boundary.

A2—3 to 23 inches; olive yellow (2.5Y 6/6) loamy sand; weak medium granular structure; very friable; strongly acid; clear wavy boundary.

B21t—23 to 34 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine subangular blocky structure; very friable, nonsticky, nonplastic; sand grains coated and bridged with clay; very strongly acid; gradual wavy boundary.

B22t—34 to 48 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; sand grains coated and bridged with clay; very strongly acid; clear wavy boundary.

B3—48 to 56 inches; yellowish brown (10YR 5/6) loamy sand; weak medium granular structure; friable, nonsticky, nonplastic; very strongly acid; clear irregular boundary.

C1—56 to 63 inches; yellowish brown (10YR 5/6) loamy sand; many coarse faint yellowish brown (10YR 5/4) mottles; massive; very friable; strongly acid; clear wavy boundary.

C2—63 to 72 inches; pale brown (10YR 6/3) sand; many coarse faint brownish yellow (10YR 6/6) mottles; single grain; loose; strongly acid.

The solum thickness ranges from 40 to 60 inches. The soil is very strongly acid or strongly acid unless limed.

The Ap or A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3; or it has hue of 2.5Y, value of 4 or 5, and chroma of 2. The A2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 6. The A horizon is loamy fine sandy or loamy sand.

The B2t and B3 horizons have hue of 10YR, value of 5 or 6, and chroma of 4 through 8; or hue of 7.5YR, value of 5 or 6, and chroma of 6 or 8. The B2t horizon is fine sandy loam or sandy clay loam. The B3 horizon is loamy sand.

The C horizon has hue of 10YR, value of 5 through 7, and chroma of 3 through 8. It commonly has high and low chroma mottles. It is sand or loamy sand.

Levy series

Soils of the Levy series are deep and very poorly drained. They formed in clayey fluvial sediments. Levy soils are on flood plains and in swamps along poorly defined drainageways. Slopes range from 0 to 1 percent.

The Levy soils in this survey area are a taxadjunct because they have less clay than is defined in the range for the series. This does not affect the use and management of the soils.

Levy soils commonly are near Eunola, Goldsboro, Nansemond and Suffolk soils. Levy soils are more poorly drained than any of these soils.

Typical pedon of Levy silty clay loam, approximately 0.8 mile west of VA-660, from a point 0.5 mile south of its intersection with VA-667:

A1—0 to 10 inches; very dark grayish brown (10YR 3/2) silty clay loam; massive; slightly sticky, slightly plastic; common coarse fragments of wood; flows easily between fingers when squeezed in hand; very strongly acid; abrupt smooth boundary.

C1g—10 to 18 inches; dark gray (10YR 4/1) clay; common medium distinct yellowish red (5YR 5/6) stains; massive; slightly sticky, slightly plastic; common coarse fragments of wood; flows easily between fingers when squeezed in hand; extremely acid; gradual smooth boundary.

C2g—18 to 40 inches; gray (10YR 5/1) clay; common medium distinct yellowish red (5YR 5/6) stains; massive; plastic; common coarse fragments of wood; flows easily between fingers when squeezed in hand; extremely acid; gradual smooth boundary.

C3g—40 to 60 inches; dark gray (10YR 4/1) clay; common medium distinct yellowish red (5YR 5/6) stains; massive; sticky; plastic; common coarse fragments of wood; flows easily between fingers when squeezed in hand; very strongly acid.

The soil has an *n* value greater than 1.0 in all mineral layers between the surface and a depth of 40 inches. The soil is extremely acid or very strongly acid in the upper 40 inches and ranges from very strongly acid through medium acid below a depth of 40 inches.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 1 or 2. It is silty clay loam or silty clay.

The C horizon to a depth of at least 40 inches has hue of 10YR or is neutral, value of 3 through 5, and chroma of 0 or 1. It is mainly clay or silty clay, but some pedons contain thin layers of clay loam. Below a depth of 40 inches, it ranges from loamy to clayey. Some of these layers have an *n* value of less than 0.7. Fragments of wood and logs are in most pedons.

Lynchburg series

Soils of the Lynchburg series are deep and somewhat poorly drained. They formed in loamy fluvial and marine sediments. Lynchburg soils are on low-lying uplands on the Coastal Plain. Slopes range from 0 to 2 percent.

Lynchburg soils commonly are near Dragston, Eunola, Goldsboro, Nansemond, and Rains soils. Lynchburg soils have more clay in the subsoil and a thicker solum than Dragston soils. They are more poorly drained than Eunola, Goldsboro, or Nansemond soils. They are not as poorly drained as Rains soils.

Typical pedon of Lynchburg fine sandy loam, approximately 0.2 mile east-northeast of the intersection of VA-673 and VA-689:

O1—2 inches to 0; brown (10YR 4/3) fragments of leaves, twigs, and humus in a mat of fine roots.

A1—0 to 4 inches; very dark grayish brown (2.5Y 3/2) fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; few fine pores; extremely acid; clear smooth boundary.

B1—4 to 13 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; few medium distinct olive brown (2.5Y 4/4) mottles; weak medium subangular blocky structure; friable, nonsticky, nonplastic; many fine and medium roots; few medium pores; very strongly acid; clear wavy boundary.

B21t—13 to 20 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; few medium and coarse roots; few large pores; thin discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.

B22tg—20 to 53 inches; light gray (2.5Y 7/2) sandy clay loam; many coarse distinct brownish yellow (10YR 6/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable, slightly sticky, nonplastic; few medium and coarse roots; few large pores; thin discontinuous clay films on faces of prisms; very strongly acid; gradual wavy boundary.

B23tg—53 to 63 inches; gray (10YR 6/1) sandy clay loam; many medium distinct yellowish brown (10YR 5/8) mottles and few fine prominent red (2.5YR 4/8) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm, sticky, slightly plastic; few medium pores; thin discontinuous clay films on faces of prisms; very strongly acid.

The solum thickness is more than 60 inches. The soil ranges from extremely acid through strongly acid unless limed.

The A horizon has hue of 10YR or 2.5Y or is neutral, value of 2 through 4, and chroma of 0 through 2. It is fine sandy loam or loamy fine sand.

The B1 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 through 6. It is sandy loam or fine sandy loam.

The upper part of the B2t horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 through 8. The lower part of the B2t horizon, which is generally at a depth of more than 20 inches, has hue of 10YR through 5Y, value of 4 through 7, and chroma of 1 or 2. The B2t horizon has mottles of higher and lower chroma and redder hue. It is dominantly sandy clay loam but in some pedons is sandy loam.

The C horizon is gray (10YR 5/1, 6/1), or it is coarsely mottled. It has stratified sandy, loamy, and clayey subhorizons.

Nansemond series

Soils of the Nansemond series are deep and moderately well drained. They formed in loamy marine and fluvial sediments. Nansemond soils are on uplands and side slopes of drainageways on the Coastal Plain. Slopes range from 0 to 30 percent.

Nansemond soils commonly are near Dragston, Eunola, Kalmia, Lynchburg, Rumford, Suffolk, Tetotum, and Weston soils. Nansemond soils have less clay in the subsoil than Eunola, Kalmia, Lynchburg, or Tetotum soils. They are better drained than Dragston, Lynchburg, or Weston soils and are not as well drained as Rumford or Suffolk soils.

Typical pedon of Nansemond fine sandy loam, 0 to 2 percent slopes, 0.5 mile north of Huntersville on VA-624, 0.7 mile west of VA-624 on farm road, and 160 feet south of farm road:

Ap—0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; common fine roots; common very fine pores; very strongly acid; abrupt wavy boundary.

B21t—8 to 19 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak coarse subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; many fine pores; few thin clay films on faces of peds; very strongly acid; clear wavy boundary.

B22t—19 to 29 inches; yellowish brown (10YR 5/6) fine sandy loam; common medium distinct white (10YR 8/2) and yellowish red (5YR 5/6) mottles; moderate coarse subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; common fine pores; few thin clay films on faces of peds; very strongly acid; clear wavy boundary.

B31—29 to 41 inches; yellowish brown (10YR 5/8) loamy fine sand; few fine distinct yellowish red (5YR 5/8) mottles; weak coarse subangular blocky structure; very friable, nonsticky, nonplastic; many fine pores; sand grains coated and bridged with clay; many 1/2 to 1 inch diameter pockets and lenses of white (10YR 8/2) clean sand grains; extremely acid; diffuse irregular boundary.

B32—41 to 66 inches; brownish yellow (10YR 6/6) loamy fine sand; common coarse distinct strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; very friable, nonsticky, nonplastic; many fine pores; sand grains coated and bridged with clay; many 1 to 3 inch diameter pockets and lenses of light gray (5Y 7/1) clean sand grains; very strongly acid; gradual wavy boundary.

C—66 to 70 inches; light gray (10YR 7/1) fine sand; common medium distinct very pale brown (10YR 7/4) mottles; single grain; loose; very strongly acid.

The solum thickness ranges from 35 to 70 inches. The soil ranges from extremely acid through strongly acid unless limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 1 through 4. It is fine sandy loam or loamy fine sand.

The B2t horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 through 6. The lower part of the B2t horizon of some pedons has colors similar to the B3 horizon. The B2t horizon is mainly fine sandy loam or sandy loam. Some pedons have a thin subhorizon of sandy clay loam.

The B3 horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 2 through 8. It is loamy fine sand or loamy sand. Pockets and lenses of clean sand are in most pedons.

The C horizon has hue of 7.5YR through 5Y, value of 5 through 8, and chroma of 1 through 8. It is mainly sand, fine sand, loamy fine sand, or loamy sand. Some pedons have lenses of sandy clay loam.

Pactolus series

Soils of the Pactolus series are deep and moderately well to somewhat poorly drained. They formed in sandy marine and fluvial sediments. Pactolus soils are on low-lying ridges and along streams in the Coastal Plain. Slopes range from 0 to 2 percent.

Pactolus soils commonly are near Alaga, Dragston, Eunola, Kalmia, Kenansville, and Nansemond soils. Pactolus soils are more poorly drained than Alaga, Kalmia, or Kenansville soils. They do not have a loamy subsoil characteristic of Dragston, Eunola, or Nansemond soils.

Typical pedon of Pactolus loamy fine sand, 0.5 mile southeast of VA-660 on Union Camp Road, 300 feet south of Union Camp Road:

A1—0 to 2 inches; gray (10YR 5/1) loamy fine sand; weak fine granular structure; very friable; few fine and medium roots; very strongly acid; clear smooth boundary.

C1—2 to 13 inches; light yellowish brown (10YR 6/4) loamy sand; few medium faint very pale brown (10YR 7/4) mottles; single grain; loose; few fine and medium roots; strongly acid; clear smooth boundary.

C2—13 to 25 inches; very pale brown (10YR 7/4) loamy sand; few medium faint very pale brown (10YR 7/3) mottles; single grain; loose; few fine roots; strongly acid; clear smooth boundary.

C3—25 to 38 inches; very pale brown (10YR 7/3) loamy sand; few medium faint light gray (10YR 7/2) mottles; single grain; loose; few fine roots; strongly acid; clear smooth boundary.

C4g—38 to 80 inches; light gray (10YR 7/2) loamy sand; common medium faint white (10YR 8/2) mottles; single grain; loose; few fine roots; strongly acid.

Thickness of the sandy horizons is 80 inches or more. The soil is very strongly acid or strongly acid unless limed.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 1 or 2. It is loamy sand, loamy fine sand, or fine sand.

The upper part of the C horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. The lower part of the C horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 through 4. The C horizon commonly has high- and low-chroma mottles. It is sand or loamy sand.

Pungo series

Soils of the Pungo series are deep and very poorly drained. They are organic soils that formed in well decomposed plant remains overlying loamy and clayey mineral sediments of marine origin. Pungo soils are in the Dismal Swamp. Slopes range from 0 to 1 percent.

Pungo soils commonly are near Belhaven and Deloss soils. Pungo soils have a thicker organic layer than

Belhaven soils; Deloss soils do not have an organic surface layer.

Typical pedon of Pungo muck, in the Dismal Swamp, 1/10 mile south of the intersection of New Ditch and Williamson Ditch:

Oa1—0 to 6 inches; black (5YR 2/1, broken face and rubbed) muck (sapric material); about 5 percent fibers unrubbed, 2 percent rubbed; strong fine granular structure; very friable; many small and medium roots and few large roots; extremely acid; abrupt smooth boundary.

Oa2—6 to 18 inches; black (5YR 2/1, broken face and rubbed) muck (sapric material); about 5 percent fibers unrubbed, 2 percent rubbed; strong coarse subangular blocky structure parting to strong fine and medium granular; friable, nonsticky, nonplastic; extremely acid; abrupt smooth boundary.

Oa3—18 to 29 inches; very dark brown (10YR 2/2, broken face and rubbed) muck (sapric material); about 5 percent fibers unrubbed, 2 percent rubbed; many stumps and logs; extremely acid; abrupt smooth boundary.

Oa4—29 to 40 inches; dark reddish brown (5YR 2/2, broken face and rubbed) muck (sapric material); about 20 percent fibers unrubbed, 3 percent rubbed; massive; nonsticky, nonplastic; many stumps and logs; extremely acid; abrupt smooth boundary.

Oa5—40 to 59 inches; dark reddish brown (5YR 2/2, broken face and rubbed) muck (sapric material); about 20 percent fibers unrubbed, 3 percent rubbed; massive; nonsticky, nonplastic; extremely acid; abrupt smooth boundary.

Oa6—59 to 102 inches; black (10YR 2/1, broken face and rubbed) muck (sapric material); about 50 percent fibers unrubbed, 12 percent rubbed; massive; nonsticky, nonplastic; extremely acid; abrupt smooth boundary.

IICg—102 to 110 inches; very dark gray (N 3/0) silty clay; massive; very sticky; flows easily through fingers when squeezed; very strongly acid.

The thickness of the organic soil material ranges from 51 to 90 inches or more. The organic layers are extremely acid, and the underlying mineral layers range from extremely acid through strongly acid. The surface tier is, by volume, 0 to 15 percent logs, stumps, and fragments of wood, the subsurface tier is 10 to 35 percent, and the bottom tier is 0 to 10 percent.

The Oa1 layer has hue of 5YR or 10YR, value of 2 or 3, and chroma of 0 through 2.

The Oa layers below the surface layer have hue of 2.5YR, 5YR, or 10YR; value of 2 or 3; and chroma of 1 or 2. At least 10 inches of the 0a layers have hue of 2.5YR or 5YR. The Oa layer is 30 to 80 percent organic material.

The IICg layer is gray or gleyed loamy and clayey mineral material.

Rains series

Soils of the Rains series are deep and poorly drained. They formed in loamy fluvial and marine sediments. Rains soils are on low-lying upland flats and in depressions on the Coastal Plain. Slopes range from 0 to 2 percent.

The Rains soils in this survey area are a taxadjunct because they have more silt than is defined in the range for the series. This does not affect the use and management of the soils.

Rains soils commonly are near Eunola and Lynchburg soils. Rains soils are more poorly drained than either of those soils.

Typical pedon of Rains fine sandy loam, approximately 1/8 mile southeast of the intersection of VA-672 and VA-677, 340 feet east of VA-672, and 75 feet south of access road:

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam; moderate fine and medium granular structure; very friable; common fine and medium roots; very strongly acid; clear wavy boundary.

B1g—6 to 11 inches; light gray (10YR 7/1) loam; common medium distinct dark gray (10YR 4/1) mottles and few fine distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; very strongly acid; clear wavy boundary.

B21tg—11 to 36 inches; light gray (10YR 7/1) loam; many coarse distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable, sticky, slightly plastic; few fine roots; few thin clay films on faces of peds; very strongly acid; gradual wavy boundary.

B22tg—36 to 51 inches; gray (10YR 6/1) sandy clay loam; many coarse distinct yellowish brown (10YR 5/8) mottles and common medium prominent red (2.5YR 5/8) mottles; weak coarse subangular blocky structure; friable, sticky, slightly plastic; few fine roots; few thin clay films on faces of peds; very strongly acid; gradual wavy boundary.

B23tg—51 to 65 inches; gray (10YR 6/1) sandy clay loam; few medium distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few thin clay or silt coatings on faces of peds; very strongly acid.

The solum thickness is more than 60 inches. The soil is very strongly acid or strongly acid unless limed.

The A1 horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2. It is fine sandy loam or loam.

The B1 and B2t horizons have hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1. The B2t horizon commonly has high chroma mottles. The B1 horizon is loam or fine sandy loam. The B2t horizon is loam or sandy clay loam.

Rumford series

Soils of the Rumford series are deep and well drained. They formed in loamy fluvial and marine sediments. Rumford soils are on uplands and side slopes adjacent to drainageways. Slopes range from 0 to 6 percent.

The Rumford soils in this survey area are a taxadjunct because they have more silt than is defined in the range for the series. This does not affect the use and management of the soils.

Rumford soils commonly are near Kenansville, Nansemond, and Pactolus soils. Rumford soils do not have a thick, sandy surface layer typical of Kenansville soils, are better drained than Nansemond soils, and are better drained and have more clay than Pactolus soils.

Typical pedon of Rumford loamy fine sand, 0 to 2 percent slopes, 0.52 mile west of the intersection of VA-638 and US-460, approximately 925 feet southwest of VA-638:

Ap—0 to 10 inches; brown (10YR 5/3) loamy fine sand; weak fine granular structure; very friable; slightly acid; abrupt smooth boundary.

A2—10 to 13 inches; pale brown (10YR 6/3) loamy fine sand; many fine faint yellowish brown (10YR 5/6) mottles; weak medium granular structure; very friable; slightly acid; gradual smooth boundary.

B2t—13 to 27 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; few thin clay films on faces of peds; medium acid; clear wavy boundary.

B3t—27 to 36 inches; yellowish brown (10YR 5/6) fine sandy loam; weak coarse subangular blocky structure; very friable, nonsticky, nonplastic; sand grains are coated and bridged with clay; strongly acid; clear wavy boundary.

C—36 to 72 inches; yellowish brown (10YR 5/6) loamy sand; single grain; loose; thin vertical streaks of light gray (10YR 7/1) sand; strongly acid.

The solum thickness ranges from 30 to 55 inches. The soil is dominantly strongly acid or medium acid unless limed.

The A1 or Ap horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. The A2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. The A horizon is loamy fine sand or fine sandy loam.

The B2t and B3t horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 8. The B2t horizon is fine sandy loam or sandy clay loam. The B3 horizon is fine sandy loam or loamy fine sand.

The C horizon is stratified sandy loam, loamy sand, and sand.

State series

Soils of the State series are deep and well drained. They formed in loamy fluvial and marine sediments. State soils are on old stream terraces and low-lying uplands, generally at an elevation of less than 30 feet. Slopes range from 0 to 6 percent.

State soils commonly are near Dragston, Kalmia, Nansemond, and Tetotum soils. State soils are better drained and have more clay in the subsoil than Dragston or Nansemond soils. They do not have the contrasting sandy substratum that is characteristic of Kalmia soils. They are better drained than Tetotum soils.

Typical pedon of State fine sandy loam, 0 to 2 percent slopes, approximately 500 yards southeast of the Nansemond River bridge and 200 yards east of US-17:

Ap—0 to 10 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

A12—10 to 16 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

B1—16 to 22 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium granular structure; very friable; few fine roots; old root channels filled with material from A horizon; strongly acid; clear smooth boundary.

B21t—22 to 28 inches; light yellowish brown (10YR 6/4) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; many fine and medium pores; few thin clay films on faces of peds; few small quartz pebbles; strongly acid; clear wavy boundary.

B22t—28 to 44 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium pores; few thin clay films on faces of peds; few fine flakes of mica; few small quartz pebbles; strongly acid; gradual wavy boundary.

B3—44 to 52 inches; yellowish brown (10YR 5/6) stratified sandy clay loam and fine sandy loam; few medium distinct reddish yellow (7.5YR 6/8) and pale yellow (2.5Y 7/4) mottles; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; few small quartz pebbles; very strongly acid; gradual wavy boundary.

C—52 to 65 inches; stratified light yellowish brown (10YR 6/4), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/8) loamy sand and fine sandy loam; massive; very friable; few small quartz pebbles; very strongly acid.

The solum thickness ranges from 40 to 60 inches. The soil is very strongly acid or strongly acid unless limed.

The Ap or A1 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 4. The A horizon is fine sandy loam, sandy loam, or loamy fine sand.

The B horizon has hue of 10YR, value of 5 or 6, and chroma of 4 through 8. In some pedons the lower part of

the B2t horizon and the B3 horizon have hue of 2.5Y. The B1 horizon is fine sandy loam or sandy loam. The B2t and B3 horizons are fine sandy loam or sandy clay loam.

The C horizon is stratified fine sandy loam, loamy sand, and sand.

Suffolk series

Soils of the Suffolk series are deep and well drained. They formed in loamy fluvial and marine sediments. Suffolk soils are on uplands and side slopes on the Coastal Plain. Slopes range from 0 to 6 percent.

Suffolk soils commonly are near Emporia, Eunola, Goldsboro, Kenansville, and Nansemond soils. Suffolk soils have a more permeable subsoil than Emporia soils and are better drained than Eunola, Goldsboro, or Nansemond soils. Suffolk soils do not have the thick, sandy surface layer characteristic of Kenansville soils.

Typical pedon of Suffolk loamy sand, 0 to 2 percent slopes, 1.3 miles southwest of Chuckatuck Post Office, 0.4 mile west of Oakland Elementary School, 300 feet southwest of VA-601, 1,200 feet northwest of VA-603:

Ap—0 to 11 inches; dark grayish brown (10YR 4/2) loamy sand; weak medium granular structure; very friable; many fine and medium roots; slightly acid; abrupt smooth boundary.

B1—11 to 16 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine roots; many fine tubular pores; strongly acid; clear wavy boundary.

B21t—16 to 20 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine and medium roots; common fine and medium tubular pores; thin patchy clay films on faces of peds; extremely acid; clear wavy boundary.

B22t—20 to 29 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common fine tubular pores; thin patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B23t—29 to 38 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine tubular pores; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B3t—38 to 47 inches; yellowish brown (10YR 5/8) fine sandy loam; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay; very strongly acid; gradual irregular boundary.

C—47 to 65 inches; light yellowish brown (2.5Y 6/4) loamy sand; few coarse distinct strong brown (7.5YR 5/8) mottles; single grain; loose; strong brown material is massive and firm; very strongly acid.

The solum thickness ranges from 35 to 50 inches. The soil ranges from extremely acid through strongly acid unless limed.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 3. It is loamy sand or fine sandy loam.

The B1 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 6. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. The B2t horizon is fine sandy loam or sandy clay loam. The B3t horizon is sandy loam or fine sandy loam.

The C horizon has colors similar to those in the Bt horizon. In addition, it has hue of 2.5Y, value of 5 through 7, and chroma of 2 through 8. It is fine sand, loamy sand, or loamy fine sand.

Tetotum series

Soils of the Tetotum series are deep and moderately well drained. They formed in loamy marine and fluvial sediments. Tetotum soils are generally at an elevation of less than 30 feet. They are on old stream terraces, low-lying uplands, and side slopes of drainageways. Slopes range from 0 to 6 percent.

Tetotum soils commonly are near State and Tomotley soils. Tetotum soils are not as well drained as State soils and are not as poorly drained as Tomotley soils.

Typical pedon of Tetotum fine sandy loam, 0 to 2 percent slopes, approximately 0.65 mile east of the intersection of VA-600 and VA-604, 0.43 mile south of VA-600:

Ap—0 to 11 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; very friable, nonsticky, nonplastic; common fine roots; very strongly acid; abrupt smooth boundary.

B1—11 to 20 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; common fine roots; many fine vertical and horizontal tubular pores; strongly acid; clear wavy boundary.

B21t—20 to 29 inches; yellowish brown (10YR 5/4) sandy clay loam; many medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; few very fine continuous vertical and horizontal tubular pores; thin discontinuous silt or clay films on faces of peds; strongly acid; clear wavy boundary.

B22t—29 to 45 inches; yellowish brown (10YR 5/8) clay loam; many coarse faint yellowish brown (10YR 5/4) mottles and common coarse distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few very fine continuous vertical and horizontal tubular pores; thin

continuous yellowish brown (10YR 5/4) silt or clay films on faces of peds; very strongly acid; clear wavy boundary.

B3g—45 to 65 inches; light gray (2.5Y 7/2) loam; many medium distinct yellowish brown (10YR 5/4) mottles and common medium distinct red (2.5YR 4/8) mottles; weak coarse subangular blocky structure; friable, slightly sticky, nonplastic; common fine continuous horizontal tubular pores; few white quartz pebbles; few lenses of white uncoated sand; very strongly acid; clear wavy boundary.

C—65 to 85 inches; yellowish brown (10YR 5/4) sandy loam; many coarse distinct light gray (2.5Y 7/2) mottles; massive; very friable; very strongly acid.

The solum thickness ranges from 40 to 60 inches or more. The soil is very strongly acid or strongly acid unless limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 or 3. It is fine sandy loam.

The B1 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. It is fine sandy loam or sandy clay loam.

The B2t horizon has matrix hue of 10YR or 2.5Y, value of 5 or 6 and chroma of 4 through 8. It is sandy clay loam or clay loam.

The B3 horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 1 or 2. It commonly has high- and low-chroma mottles. It is sandy loam, loam, or sandy clay loam.

The C horizon is mainly sand, loamy sand, or sandy loam. Some pedons have bodies of sandy clay loam.

Tomotley series

Soils of the Tomotley series are deep and poorly drained. They formed in loamy marine and fluvial sediments. Tomotley soils are on flats at an elevation of less than 30 feet. Slopes range from 0 to 2 percent.

Tomotley soils commonly are near Deloss, Dragston, and Weston soils. Tomotley soils do not have the thick, dark mucky surface layer characteristic of Deloss soils. Tomotley soils are more poorly drained than Dragston soils and have more clay and silt in the subsoil than Weston soils.

Typical pedon of Tomotley loam, 660 feet west of VA-135 and 660 feet north of US-17, 0.4 mile west of the Chesapeake city limit:

A1—0 to 7 inches; dark gray (10YR 4/1) loam; weak fine granular structure; very friable; many fine roots; common uncoated grains of sand; very strongly acid; abrupt smooth boundary.

B21tg—7 to 11 inches; gray (10YR 5/1) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; thin discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.

B22tg—11 to 20 inches; gray (10YR 5/1) clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common thin continuous clay films on faces of peds; very strongly acid; clear wavy boundary.

B23tg—20 to 43 inches; gray (10YR 5/1) loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable, nonsticky, nonplastic; few fine roots; few thin patchy clay films on faces of peds; sand grains coated and bridged with clay; very strongly acid; clear irregular boundary.

Cg—43 to 61 inches; light gray (10YR 7/2) loamy fine sand; many medium and coarse distinct brownish yellow (10YR 6/8) mottles and common coarse distinct dark gray (10YR 4/1) mottles; massive; nonsticky, nonplastic; very strongly acid.

The solum thickness ranges from 40 to 55 inches. The soil is very strongly acid or strongly acid unless limed.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. Where the value is 3, the horizon is less than 10 inches thick. The A horizon is fine sandy loam or loam.

The B horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 1 or 2. The B horizon commonly has high-chroma mottles. It is loam, sandy clay loam, or clay loam.

The Cg horizon has hue of 10YR through 5Y, value of 6 or 7, and chroma of 1 or 2. It commonly is loamy fine sand and has thin strata of fine sandy loam and sand.

Torhunta series

Soils of the Torhunta series are deep and very poorly drained. They formed in loamy fluvial and marine sediments. Torhunta soils are on flats along the perimeter of the Dismal Swamp and in Briars Pocosin and other upland swamps. Slopes range from 0 to 2 percent.

Torhunta soils commonly are near Deloss, Dragston, Tomotley, and Weston soils. Torhunta soils have less clay in the subsoil than Deloss soils. They are more poorly drained than Dragston soils and are more poorly drained and have less clay in the subsoil than Tomotley soils. Torhunta soils have a thicker, darker surface layer than Weston soils.

Typical pedon of Torhunta loam, approximately 0.83 mile south of railroad crossing at VA-337, 1/4 mile west of the intersection of VA-337 and VA-626, at Shoulders Hill:

A1—0 to 16 inches; very dark grayish brown (10YR 3/2) loam; moderate coarse granular structure; friable; nonsticky, nonplastic; common uncoated sand grains; very strongly acid; abrupt irregular boundary.

Bg—16 to 30 inches; grayish brown (10YR 5/2) fine sandy loam; common coarse distinct yellowish red

(5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin silt coatings on sand grains; few fine and medium distinct gray (5Y 6/1) brittle sand concretions; very strongly acid; clear irregular boundary.

C1—30 to 60 inches; yellowish brown (10YR 5/8) loamy sand; common medium prominent gray (5Y 5/1) mottles; single grain; loose; extremely acid; abrupt smooth boundary.

C2g—60 to 65 inches; dark greenish gray (5GY 4/1) sandy loam; massive; friable, slightly sticky, nonplastic; extremely acid.

The solum thickness ranges from 25 to 38 inches. The soil ranges from extremely acid through strongly acid unless limed.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is loam or fine sandy loam.

The Bg horizon has matrix hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It commonly has high-chroma mottles. It is sandy loam or fine sandy loam.

The C horizon is stratified sand, loamy sand, or sandy loam.

Udorthents

Udorthents in this survey area consist of nearly level to steep, well drained to poorly drained, loamy soil material that has been moved, filled in, or reworked by machinery. Most of the areas have been reshaped and smoothed, or they consist of cuts and excavations that extend several feet into the underlying geologic material. The areas are scattered throughout the survey area, but most areas are in or near urban and industrial centers.

Udorthents commonly are brown, strong brown, or yellowish brown sandy loam or sandy clay loam but include some loamy sands and clay loams. Other small included areas are clayey. The soil materials range from very strongly acid through medium acid. Permeability is moderate to slow. A seasonal high water table ranges in depth from about 1 foot to more than 6 feet. Some areas contain trash and rubble. Slopes range from 0 to 50 percent.

Urban land

Urban land in this survey area consists of areas where 85 percent or more of the surface layer is covered by asphalt, concrete, buildings, or other impervious surfaces. Most areas of urban land are in and near business, industrial, and residential centers.

Wahee series

Soils of the Wahee series are deep and somewhat poorly drained. They formed in clayey fluvial and marine sediments. Wahee soils are commonly near drainageways in stream terraces and uplands. Slopes range from 0 to 2 percent.

Wahee soils commonly are near Dogue, Emporia, Eunola, Goldsboro, Lynchburg, Rains, and Tomotley soils. Wahee soils are more poorly drained than Dogue soils and are more poorly drained and have more clay in the subsoil than Emporia, Eunola, or Goldsboro soils. Wahee soils have more clay than Lynchburg, Rains, or Tomotley soils and are not as poorly drained as Rains or Tomotley soils.

Typical pedon of Wahee silt loam, 0.65 mile north of the intersection of VA-667 and VA-745, 0.63 mile northeast of VA-745 on Union Camp access road, 50 feet north of Union Camp access road:

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

A2—2 to 4 inches; pale brown (10YR 6/3) silt loam; many medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium and coarse granular structure; friable, slightly sticky, nonplastic; common fine roots; very strongly acid; abrupt wavy boundary.

B1t—4 to 9 inches; light yellowish brown (2.5Y 6/4) clay loam; many medium distinct grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; few thin clay films on faces of peds; very strongly acid; abrupt wavy boundary.

B21t—9 to 24 inches; light yellowish brown (10YR 6/4) silty clay; common fine distinct light gray (10YR 7/1) and strong brown (7.5YR 5/8) mottles; strong medium prismatic structure parting to moderate medium and fine subangular blocky; firm, sticky, slightly plastic; few fine roots; thin continuous clay films on faces of peds; strongly acid; clear wavy boundary.

B22tg—24 to 41 inches; light gray (10YR 7/1) silty clay; many fine distinct yellowish brown (10YR 5/8) mottles; strong medium prismatic structure parting to moderate medium subangular blocky; very firm, sticky, slightly plastic; few fine roots; thin continuous clay films on faces of peds; very strongly acid; clear wavy boundary.

B23tg—41 to 46 inches; light gray (10YR 7/1) silty clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable, nonsticky, nonplastic; very strongly acid; clear wavy boundary.

B3g—46 to 62 inches; light gray (10YR 7/1) fine sandy loam; many coarse distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable, nonsticky, nonplastic; very strongly acid.

The solum thickness ranges from 50 to 80 inches. The soil is very strongly acid or strongly acid unless limed.

The A1 or Ap horizon has hue of 10YR or is neutral, value of 3 through 5, and chroma of 0 through 2. The A2

horizon has hue of 10YR, value of 5 through 7, and chroma of 2 through 4. The A horizon is loam or silt loam.

The B1 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 through 6. It is sandy clay loam or clay loam.

The B2t horizon has hue of 10YR through 5Y or is neutral, value of 5 through 7, and chroma of 0 through 4. It has common to many high-chroma mottles. It is silty clay, clay loam, silty clay loam, or clay.

The B3 horizon has hue of 10YR through 5Y or is neutral, value of 5 through 7, and chroma of 0 through 2. It has common to many high-chroma mottles. It is sandy clay loam, silty clay loam, or fine sandy loam.

Weston series

Soils of the Weston series are deep and poorly drained. They formed in loamy marine and fluvial sediments. Weston soils are on broad flats mostly along the northern perimeter of the Dismal Swamp. Slopes range from 0 to 2 percent.

Weston soils commonly are near Dragston, Tomotley, and Torhunta soils. Weston soils are more poorly drained than Dragston soils. They have less clay and less silt in the subsoil than Tomotley soils and do not have the thick, dark surface layer that is typical of Torhunta soils.

Typical pedon of Weston fine sandy loam, approximately 0.15 mile northwest of the intersection of VA-624 and VA-658, 0.2 mile southwest of VA-624:

Ap—0 to 8 inches; very dark gray (10YR 3/1) fine sandy loam; weak fine granular structure; very friable; common fine roots; common very fine pores; strongly acid; abrupt smooth boundary.

B21tg—8 to 18 inches; grayish brown (10YR 5/2) loam; few fine faint pale brown (10YR 6/3) mottles; weak coarse and medium subangular blocky structure; friable, nonsticky, nonplastic; few fine roots; common fine pores; common thin silt or clay films on faces of peds and in pores; strongly acid; gradual wavy boundary.

B22tg—18 to 29 inches; gray (10YR 5/1) loam; common medium distinct light olive brown (2.5Y 5/6) mottles; weak medium and coarse subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; few fine pores; common thin silt or clay films on faces of peds and in pores; strongly acid; clear wavy boundary.

B3g—29 to 39 inches; gray (10YR 6/1) fine sandy loam; common fine distinct olive brown (2.5Y 4/4) mottles; weak coarse subangular blocky structure; very friable; many medium coarse irregular pores; strongly acid; clear wavy boundary.

IIC1—39 to 51 inches; yellowish brown (10YR 5/8) loamy sand; many coarse distinct white (5Y 8/1) mottles; single grain; loose; many coarse bodies of white (5Y 8/1) sand; strongly acid; abrupt wavy boundary.

IIC2g—51 to 62 inches; white (5Y 8/1) sand; many medium faint light olive gray (5Y 6/2) mottles; single grain; loose; many coarse bodies of yellowish brown (10YR 5/8) loamy sand in lower part; very strongly acid.

The solum thickness ranges from 36 to 45 inches. The soil is very strongly acid or strongly acid unless limed.

The A horizon has hue of 10YR, value of 3 through 6, and chroma of 1 or 2. It is fine sandy loam or loamy fine sand.

The B horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The B horizon commonly has high-chroma mottles. It is loam or fine sandy loam.

The C horizon has hue of 10YR through 5Y, value of 5 through 8, and chroma of 1 through 8. It mainly is sand or loamy sand and commonly has thin strata of fine sandy loam.

formation of the soils

The factors and processes that cause soil to be formed are described in the following pages.

factors of soil formation

Soil formation is the result of several factors, the most important of which are parent material, relief, climate, living organisms, and time. The relative importance of these factors differs from place to place. For most of Suffolk, the differences between soils were caused mainly by differences in relief, parent material, and length of time the soils have been forming. For the organic soils of the Dismal Swamp, however, relief and living organisms have influenced the resulting soil most strongly. In places, one factor may dominate and, in extreme cases, determine most of the soil properties, but normally the interaction of all five factors determines what kind of soil develops in any given place.

parent material

Parent material is the material from which soils form. It influences the mineral, chemical, and organic composition of the soils.

Soils in the City of Suffolk formed in four general types of parent material (*3*), all of which are Coastal Plain sediments deposited in brackish water or freshwater: (1) stillwater deposits of sand, silt, and clay; (2) sand from flowing streams; (3) clay and silt from slowly flowing tidal creeks and rivers; and (4) stillwater deposits of organic material.

Stillwater deposits of sand, silt, and clay are the parent materials of most of the soils in the City of Suffolk. The sediments were deposited in bays, on tidal flats, and in lagoons, estuaries, and tidal channels at a time when the

sea level was higher than it is now. These deposits are the silty sand of the Windsor Formation and the silty clay and clayey sand of the Sand Bridge Formation. The Windsor Formation (*6*) is on the Wicomico Terrace in the western part of the survey area at an elevation of 50 to 86 feet above sea level. Eunola, Lynchburg, and Rains soils, for example, formed in these sediments. The Sand Bridge Formation is on the Dismal Swamp Terrace (*6*) in the eastern part of the survey area at an elevation of 18 to 25 feet. These terraces are separated by the Suffolk Scarp. Soils such as Dragston, Kalmia, Tetotum, Wahee, and Weston soils formed on the Dismal Swamp Terrace.

Sand from flowing streams made up the sediments in which soils such as Alaga and Pactolus soils have formed. These are commonly at an elevation of less than 40 feet above sea level in several parts of the survey area.

Clay and silt deposits from slowly flowing streams formed tidal marshes and freshwater swamps throughout the area. Bohicket and Levy soils formed in these deposits.

Stillwater deposits of organic material have formed in swampy areas, notably large areas in the Dismal Swamp. Belhaven and Pungo soils formed in thick deposits of organic materials, and Deloss soils formed in thinner deposits.

relief

Relief, or the shape of the landscape, determines the surface drainage of the soils. Slopes in the City of Suffolk are generally steepest near natural drainageways and become less steep on the interstream divides and on low-lying areas. Well drained and moderately well drained soils are commonly along natural drainageways. Soils on the interstream divides are moderately well drained, somewhat poorly drained, and poorly drained. In upland swamps, or pocosins, the soils are mostly poorly drained. In broad, flat, low-lying areas, such as the Dismal Swamp, the soils are mostly very poorly drained. Soils on stream bottoms and in tidal marshes are commonly poorly drained or very poorly drained.

climate

The humid, temperate, maritime climate of the City of Suffolk has caused deep weathering of parent materials and strong leaching of the soils. Most soils are quite acid and low in plant nutrients. Weathering in most of the upland soils formed clay, which has been leached from the surface layer into the subsoil by percolating water. Alternate wetting and drying of the soils is responsible for a blocky structure in most subsoils and for the segretation and translocation of iron in many soils. More detailed information about the climate is in the section "General nature of the survey area."

living organisms

Plant and animal life influences the formation of soils through life processes and decay. Vegetation adds organic matter to the soil through leaf fall and plant roots. Roots also create channels in the soil through which water and air can enter and circulate. Organic matter is also a food supply for bacteria, fungi, earthworms, and ants which, in turn, add their remains to the soil. Organic acids are produced that break down minerals in the soil to release plant nutrients.

Man influences soil formation by clearing and controlling vegetation, by tillage, by use of chemical fertilizers and lime, and by using drainage.

time

The length of time that the parent material and soil have been exposed to the influences of climate and plant and animal life has much to do with how the soil has formed and developed. Those soils formed in recently deposited sediments, for example, show little development other than an accumulation of organic matter in the surface layer. Those formed in quartz sand, which weathers very slowly, often show little development other than an accumulation of organic matter in the surface layer and some oxidation of iron.

processes of soil formation

Soils form by the weathering of parent materials and the accumulation of organic materials. All the factors of soil formation act to create unique soil layer arrangements. Some of the processes that occur tend to destroy differences between layers in the parent material while others create new layers, or horizons.

Most of the soils in Suffolk (those on uplands and on terraces along the major streams) show a moderate contrast between soil layers in the soil profile; the processes of soil formation have produced definite changes in the material in which these soils formed. Other soils (those on flood plains, on alluvial fans, and in the Dismal Swamp) are only slightly modified and have essentially the same layers they inherited from their parent material.

The weathering of the soils from their parent material is physical and chemical; weathering adds to, removes from, relocates, or transforms materials in the soil.

Additions were made to the parent materials in rainwater, dust, and organic matter. Carbon dioxide, calcium, magnesium, and sodium are commonly added in rainwater near the seacoast. Blowing dust deposited on the parent material was high in base saturation but low in cation exchange capacity. Carbon and nitrogen were added in organic matter. Removal of carbon and nitrogen occurs through volatilization while calcium, sodium, magnesium, chlorides, and nitrates are lost in percolating waters.

Relocation of substances in the soil, particularly clay, is important to the classification of the resulting soil. Possibly the most widespread process in the formation

of the soils in the survey area has been the translocation of clay from the surface layer to a subsoil. Also, iron and organic matter are chemically mobilized and redeposited elsewhere in the profile, usually lower.

Transformation of parent materials occurred mostly by chemical action. Chemical weathering, for the most part, occurs when chemical reactions take place on the surfaces of clay particles or on crystal lattice surfaces (within clay particles). Some examples of chemical reaction in soil parent materials are solution, hydrolysis, hydration-dehydration, oxidation-reduction, carbonation, and chelation. These reactions cause changes in soil color, minerals, structure, mobility of substances, stickiness, and plasticity. They also tend to increase soil acidity. In the process of these reactions, clay minerals are decomposed and new ones are formed. Soil colors are changed by dehydration of sesquioxides. Organic matter is decomposed by bacterial and chemical action, and new combinations of organic and mineral substances are formed.

references

(1) American Association of State Highway and Transportation Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487-69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) Coch, Nicholas K. 1968. Geology of the Benns Church, Smithfield, Windsor, and Chuckatuck Quadrangles. Va. Div. of Min. Res. Rept. 17. 39 pp., illus.

(4) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. [Supplements replacing pp. 173-188 issued May 1962]

(5) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(6) Wentworth, Chester K. 1930. Sand and gravel resources of the Coastal Plain of Virginia. University of Virginia. Va. Geol. Surv. Bul. 32. 146 pp., illus.

glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bottom land. The normal flood plain of a stream, subject to flooding.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forb. Any herbaceous plant not a grass or a sedge.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but

is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Pocosin. Level upland "wetland" or swamp.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data were recorded in the period 1951-75 at Holland, Virginia]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	49.6	28.6	39.1	74	6	123	3.77	2.38	5.02	7	3.4
February---	51.4	30.2	40.8	74	10	105	3.78	2.10	5.14	8	1.3
March------	58.9	36.9	48.0	85	20	272	3.77	2.71	4.74	8	1.5
April------	70.2	45.7	58.0	90	27	540	3.00	1.99	3.91	7	.0
May--------	77.8	54.8	66.3	94	34	815	3.75	2.23	5.11	7	.0
June-------	84.7	62.8	73.8	98	45	1,014	4.35	2.01	6.25	6	.0
July-------	87.9	67.1	77.5	98	52	1,163	5.41	3.01	7.37	8	.0
August-----	86.6	66.2	76.4	97	50	1,128	5.90	2.47	8.68	7	.0
September--	81.6	59.8	70.7	94	39	921	4.09	1.69	6.03	5	.0
October----	71.8	48.5	60.2	88	26	626	3.96	1.42	5.99	5	.0
November---	62.3	38.7	50.5	83	20	315	2.86	1.50	3.96	6	.0
December---	52.4	31.0	41.7	75	11	174	3.50	2.34	4.55	7	1.5
Yearly:											
Average--	69.6	47.5	58.6	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	5	---	---	---	---	---	---
Total----	---	---	---	---	---	7,196	48.14	43.30	52.84	81	7.7

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1951-75 at Holland, Virginia]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 30	April 13	April 30
2 years in 10 later than--	March 23	April 8	April 25
5 years in 10 later than--	March 11	March 29	April 16
First freezing temperature in fall:			
1 year in 10 earlier than--	November 5	October 24	October 12
2 years in 10 earlier than--	November 10	October 28	October 17
5 years in 10 earlier than--	November 21	November 7	October 25

TABLE 3.--GROWING SEASON

[Data were recorded in the period 1951-75 at Holland, Virginia]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	231	202	174
8 years in 10	239	209	180
5 years in 10	254	222	192
2 years in 10	270	234	203
1 year in 10	278	241	209

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1B	Alaga loamy sand, wet substratum, 2 to 8 percent slopes	1,200	0.4
2	Belhaven muck	13,400	4.9
3	Bohicket silty clay loam	5,100	1.9
4	Deloss mucky loam	4,260	1.5
5A	Dogue fine sandy loam, 0 to 2 percent slopes	1,700	0.6
5B2	Dogue fine sandy loam, 2 to 6 percent slopes, eroded	2,300	0.8
6	Dragston fine sandy loam	5,800	2.1
7A	Emporia fine sandy loam, 0 to 2 percent slopes	760	0.3
7B2	Emporia fine sandy loam, 2 to 6 percent slopes, eroded	1,200	0.4
8A	Eunola loamy fine sand, 0 to 2 percent slopes	34,800	12.6
8B	Eunola loamy fine sand, 2 to 6 percent slopes	3,500	1.3
9A	Goldsboro fine sandy loam, 0 to 2 percent slopes	5,700	2.1
9B2	Goldsboro fine sandy loam, 2 to 5 percent slopes, eroded	2,800	1.0
10A	Kalmia fine sandy loam, wet substratum, 0 to 2 percent slopes	1,700	0.6
10B	Kalmia fine sandy loam, wet substratum, 2 to 6 percent slopes	1,400	0.5
11	Kenansville loamy sand, 0 to 4 percent slopes	15,100	5.5
12	Kenansville loamy sand, wet substratum, 0 to 4 percent slopes	2,100	0.8
13	Levy silty clay loam	13,400	4.9
14	Lynchburg fine sandy loam	18,300	6.6
15B	Nansemond loamy fine sand, 0 to 6 percent slopes	4,100	1.5
15D	Nansemond loamy fine sand, 6 to 15 percent slopes	4,600	1.7
15E	Nansemond loamy fine sand, 15 to 30 percent slopes	8,700	3.2
16A	Nansemond fine sandy loam, 0 to 2 percent slopes	7,000	2.5
16B	Nansemond fine sandy loam, 2 to 6 percent slopes	1,300	0.5
17	Pactolus loamy fine sand	2,500	0.9
18	Pungo muck	13,700	5.0
19	Rains fine sandy loam	36,600	13.3
20A	Rumford loamy fine sand, 0 to 2 percent slopes	340	0.1
20B	Rumford loamy fine sand, 2 to 6 percent slopes	190	0.1
21A	State fine sandy loam, 0 to 2 percent slopes	830	0.3
21B	State fine sandy loam, 2 to 6 percent slopes	670	0.2
22A	Suffolk loamy sand, 0 to 2 percent slopes	5,300	1.9
22B	Suffolk loamy sand, 2 to 6 percent slopes	6,200	2.3
23A	Tetotum fine sandy loam, 0 to 2 percent slopes	3,800	1.4
23B	Tetotum fine sandy loam, 2 to 6 percent slopes	1,100	0.4
24	Tomotley loam	9,100	3.3
25	Torhunta loam	6,750	2.5
26	Udorthents, loamy	1,500	0.5
27	Urban land	300	0.1
28	Wahee silt loam	1,800	0.7
29	Weston fine sandy loam	6,400	2.3
W	Water	17,900	6.5
	Total	275,200	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Soybeans	Tobacco	Wheat	Peanuts	Grass hay	Pasture
	Bu	Bu	Lb	Bu	Lb	Ton	AUM*
1B------------------------ Alaga	65	20	---	25	2,700	2.5	3.5
2------------------------- Belhaven	---	---	---	---	---	---	---
3------------------------- Bohicket	---	---	---	---	---	---	---
4------------------------- Deloss	---	---	---	---	---	---	---
5A------------------------ Dogue	125	45	---	50	3,700	3.5	6.0
5B2----------------------- Dogue	115	40	---	45	3,500	3.5	6.0
6------------------------- Dragston	125	40	---	40	3,800	3.0	5.0
7A------------------------ Emporia	110	35	3,000	40	4,000	4.0	7.0
7B2----------------------- Emporia	100	30	2,900	35	3,700	4.0	7.0
8A------------------------ Eunola	100	35	2,600	35	3,200	5.0	8.5
8B------------------------ Eunola	85	30	2,400	35	3,000	5.0	8.5
9A------------------------ Goldsboro	125	45	3,000	40	3,600	4.0	7.0
9B2----------------------- Goldsboro	115	40	2,900	50	3,400	4.0	7.0
10A----------------------- Kalmia	120	40	2,900	40	4,200	5.0	8.5
10B----------------------- Kalmia	105	35	2,800	35	4,000	4.5	7.5
11------------------------ Kenansville	70	20	2,000	30	3,000	2.5	4.0
12------------------------ Kenansville	85	25	2,200	35	3,400	3.0	4.0
13------------------------ Levy	---	---	---	---	---	---	---
14------------------------ Lynchburg	115	45	2,800	45	3,700	3.5	6.0
15B----------------------- Nansemond	115	35	2,600	40	3,900	3.0	5.0
15D----------------------- Nansemond	90	25	---	30	---	3.0	5.0

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Tobacco	Wheat	Peanuts	Grass hay	Pasture
	Bu	Bu	Lb	Bu	Lb	Ton	AUM*
15E-----Nansemond	---	---	---	---	---	---	---
16A-----Nansemond	130	40	2,900	45	4,100	4.0	7.0
16B-----Nansemond	115	35	2,600	40	3,900	4.0	7.0
17-----Pactolus	65	25	1,800	---	2,200	3.5	6.0
18-----Pungo	---	---	---	---	---	---	---
19-----Rains	130	40	---	45	---	---	8.0
20A-----Rumford	100	25	---	30	3,400	3.5	6.0
20B-----Rumford	100	20	---	25	3,200	3.5	6.0
21A-----State	130	45	3,000	45	3,300	4.2	7.5
21B-----State	120	40	2,700	45	3,000	4.2	7.5
22A-----Suffolk	130	35	3,000	45	4,500	3.5	6.0
22B-----Suffolk	125	35	2,200	40	4,200	3.5	6.0
23A-----Tetotum	150	40	---	45	4,200	3.0	5.0
23B-----Tetotum	145	35	---	35	4,000	3.0	5.0
24-----Tomotley	130	40	---	45	---	---	8.0
25-----Torhunta	---	---	---	---	---	---	---
26**. Udorthents							
27**. Urban land							
28-----Wahee	90	40	---	40	---	4.1	7.5
29-----Weston	100	40	---	45	---	---	6.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
1B------------------ Alaga	3s	Slight	Moderate	Moderate	Slight	Loblolly pine-------	80	Loblolly pine.
2------------------- Belhaven	4w	Slight	Severe	Severe	Moderate	Loblolly pine-------	65	Loblolly pine.
						Pond pine-----------	60	
						Baldcypress---------	---	
						Atlantic white-cedar	---	
4------------------- Deloss	3w	Slight	Severe	Severe	Slight	Loblolly pine-------	80	
						Baldcypress---------	---	
5A, 5B2------------- Dogue	3w	Slight	Moderate	Slight	Slight	Loblolly pine-------	90	Loblolly pine.
						Southern red oak----	80	
						Sweetgum------------	90	
						Yellow-poplar-------	95	
						White oak-----------	80	
6------------------- Dragston	3w	Slight	Moderate	Slight	Slight	Southern red oak----	80	Loblolly pine, sweetgum, yellow-poplar.
						Loblolly pine-------	85	
						Sweetgum------------	90	
						Yellow-poplar-------	90	
7A, 7B2------------- Emporia	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	76	Loblolly pine, sweetgum.
						Southern red oak----	70	
8A, 8B-------------- Eunola	2w	Slight	Moderate	Slight	Slight	Loblolly pine-------	90	Loblolly pine, sweetgum, yellow-poplar.
						Sweetgum------------	90	
9A, 9B2------------- Goldsboro	2w	Slight	Moderate	Slight	Slight	Loblolly pine-------	90	Loblolly pine, yellow-poplar, American sycamore, sweetgum.
						Sweetgum------------	90	
						Southern red oak----	---	
						White oak-----------	---	
10A, 10B------------ Kalmia	2o	Slight	Slight	Slight	Slight	Loblolly pine-------	90	Loblolly pine, yellow-poplar.
						Sweetgum------------	88	
						Yellow-poplar-------	96	
						Southern red oak----	---	
						White oak-----------	---	
11------------------ Kenansville	3s	Slight	Moderate	Moderate	Slight	Loblolly pine-------	80	Loblolly pine.
12------------------ Kenansville	3s	Slight	Moderate	Moderate	Slight	Loblolly pine-------	80	Loblolly pine.
13------------------ Levy	3w	Slight	Severe	Severe	Slight	Water tupelo--------	---	Baldcypress.
						Sweetgum------------	80	
						Red maple-----------	---	
						Baldcypress---------	---	
14------------------ Lynchburg	2w	Slight	Moderate	Slight	Slight	Loblolly pine-------	86	Loblolly pine, American sycamore, sweetgum.
						Yellow-poplar-------	92	
						Sweetgum------------	90	
						Southern red oak----	---	
						White oak-----------	---	
						Blackgum------------	---	
15B, 15D------------ Nansemond	2w	Slight	Moderate	Slight	Moderate	Loblolly pine-------	88	Loblolly pine, yellow-poplar, black walnut, sweetgum.
						Sweetgum------------	84	
						Shortleaf pine------	77	

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
15E Nansemond	2r	Moderate	Moderate	Slight	Moderate	Loblolly pine Sweetgum Shortleaf pine	88 84 77	Loblolly pine, yellow-poplar, black walnut, sweetgum.
16A, 16B Nansemond	2w	Slight	Moderate	Slight	Moderate	Loblolly pine Sweetgum Shortleaf pine	88 84 77	Loblolly pine, yellow-poplar, black walnut, sweetgum.
17 Pactolus	2w	Slight	Moderate	Moderate	Slight	Loblolly pine	84	Loblolly pine.
18 Pungo	5w	Slight	Severe	Severe	Moderate	Pond pine Baldcypress Water tupelo	55 --- ---	Loblolly pine.
19 Rains	2w	Slight	Severe	Severe	Moderate	Loblolly pine Sweetgum	94 90	Loblolly pine, sweetgum, American sycamore.
20A, 20B Rumford	3o	Slight	Slight	Slight	Slight	Southern red oak Virginia pine Loblolly pine	65 70 80	Loblolly pine.
21A, 21B State	2o	Slight	Slight	Slight	Slight	Southern red oak Yellow-poplar Virginia pine Loblolly pine	75 95 80 86	Black walnut, yellow-poplar, loblolly pine.
22A, 22B Suffolk	3o	Slight	Slight	Slight	Slight	Loblolly pine Southern red oak	83 70	Loblolly pine.
23A, 23B Tetotum	3w	Slight	Moderate	Slight	Slight	Loblolly pine Sweetgum Southern red oak	84 80 70	Loblolly pine.
24 Tomotley	2w	Slight	Severe	Severe	Slight	Loblolly pine Sweetgum Water tupelo	94 90 ---	Loblolly pine, sweetgum, American sycamore.
25 Torhunta	3w	Slight	Severe	Severe	Moderate	Loblolly pine Sweetgum Water tupelo	80 90 ---	Loblolly pine, sweetgum, American sycamore, Shumard oak.
28 Wahee	2w	Slight	Moderate	Moderate	Slight	Loblolly pine Sweetgum	86 90	Loblolly pine, sweetgum, American sycamore, water oak.
29 Weston	2w	Slight	Severe	Severe	Moderate	Loblolly pine Sweetgum Southern red oak Water oak	90 90 --- ---	Loblolly pine, Shumard oak, Nuttall oak, sweetgum.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1B Alaga	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
2 Belhaven	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
3 Bohicket	Severe: floods, ponding, percs slowly.	Severe: ponding, excess salt.	Severe: ponding, floods.	Severe: ponding.	Severe: excess salt, excess sulfur, ponding.
4 Deloss	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
5A Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
5B2 Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
6 Dragston	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
7A Emporia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: small stones, percs slowly.	Slight	Slight.
7B2 Emporia	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
8A Eunola	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
8B Eunola	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
9A Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: small stones, wetness.	Slight	Moderate: droughty.
9B2 Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Slight	Moderate: droughty.
10A Kalmia	Slight	Slight	Slight	Slight	Slight.
10B Kalmia	Slight	Slight	Moderate: slope.	Slight	Slight.
11 Kenansville	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
12: Kenansville	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
13: Levy	Severe: floods, ponding.	Severe: ponding.	Severe: ponding, floods.	Severe: ponding.	Severe: ponding, floods.
14: Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
15B: Nansemond	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: droughty.
15D: Nansemond	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, droughty.
15E: Nansemond	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, wetness.	Severe: slope.
16A: Nansemond	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
16B: Nansemond	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Slight.
17: Pactolus	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness, droughty.
18: Pungo	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus, too acid.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness.
19: Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
20A: Rumford	Slight	Slight	Slight	Slight	Moderate: droughty.
20B: Rumford	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
21A: State	Slight	Slight	Slight	Slight	Slight.
21B: State	Slight	Slight	Moderate: slope.	Slight	Slight.
22A: Suffolk	Slight	Slight	Slight	Slight	Slight.
22B: Suffolk	Slight	Slight	Moderate: slope.	Slight	Slight.
23A: Tetotum	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
23B: Tetotum	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
24: Tomotley	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
25: Torhunta	Severe: floods, ponding.	Severe: ponding.	Severe: ponding, floods.	Severe: ponding.	Severe: ponding, floods.
26*. Udorthents					
27*. Urban land					
28: Wahee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
29: Weston	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1B Alaga	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
2 Belhaven	Very poor.	Very poor.	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
3 Bohicket	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
4 Deloss	Very poor.	Very poor.	Very poor.	Fair	Fair	Good	Good	Very poor.	Fair	Good.
5A Dogue	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
5B2 Dogue	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
6 Dragston	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Fair.
7A, 7B2 Emporia	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8A, 8B Eunola	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
9A Goldsboro	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
9B2 Goldsboro	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
10A, 10B Kalmia	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
11, 12 Kenansville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
13 Levy	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Good	Good	Very poor.	Very poor.	Good.
14 Lynchburg	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
15B Nansemond	Poor	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
15D Nansemond	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
15E Nansemond	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
16A, 16B Nansemond	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
17 Pactolus	Fair	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
18 Pungo	Very poor.	Very poor.	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
19------------------ Rains	Very poor.	Very poor.	Very poor.	Fair	Fair	Good	Good	Very poor.	Poor	Good.
20A, 20B------------ Rumford	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
21A, 21B------------ State	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
22A, 22B------------ Suffolk	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
23A----------------- Tetotum	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
23B----------------- Tetotum	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
24------------------ Tomotley	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
25------------------ Torhunta	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
26*. Udorthents										
27*. Urban land										
28------------------ Wahee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
29------------------ Weston	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1B----------------- Alaga	Severe: cutbanks cave.	Slight----------	Moderate: wetness.	Slight----------	Slight----------	Moderate: droughty.
2----------------- Belhaven	Severe: excess humus, wetness.	Severe: floods, wetness, low strength.	Severe: floods, wetness.	Severe: floods, wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, excess humus.
3----------------- Bohicket	Severe: ponding.	Severe: floods, ponding, shrink-swell.	Severe: floods, ponding, shrink-swell.	Severe: floods, ponding, shrink-swell.	Severe: low strength, ponding, floods.	Severe: excess salt, excess sulfur, ponding.
4----------------- Deloss	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
5A---------------- Dogue	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
5B2--------------- Dogue	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: wetness.
6----------------- Dragston	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
7A---------------- Emporia	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Moderate: low strength.	Slight.
7B2--------------- Emporia	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: slope, shrink-swell.	Moderate: low strength.	Slight.
8A---------------- Eunola	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
8B---------------- Eunola	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness.
9A, 9B2----------- Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
10A--------------- Kalmia	Severe: cutbanks cave.	Slight----------	Moderate: wetness.	Slight----------	Slight----------	Slight.
10B--------------- Kalmia	Severe: cutbanks cave.	Slight----------	Moderate: wetness.	Moderate: slope.	Slight----------	Slight.
11---------------- Kenansville	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: droughty.
12---------------- Kenansville	Severe: cutbanks cave.	Slight----------	Moderate: wetness.	Slight----------	Slight----------	Moderate: droughty.
13---------------- Levy	Severe: ponding.	Severe: floods, ponding, shrink-swell.	Severe: floods, ponding, shrink-swell.	Severe: floods, ponding, shrink-swell.	Severe: low strength, ponding, floods.	Severe: ponding, floods.
14---------------- Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
15B Nansemond	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness, droughty.
15D Nansemond	Severe: wetness, cutbanks cave.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Moderate: slope, wetness.	Moderate: slope, wetness, droughty.
15E Nansemond	Severe: slope, wetness, cutbanks cave.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
16A Nansemond	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
16B Nansemond	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Slight.
17 Pactolus	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
18 Pungo	Severe: excess humus, wetness.	Severe: floods, low strength, wetness.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.	Severe: wetness.	Severe: wetness.
19 Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
20A Rumford	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
20B Rumford	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
21A State	Slight	Slight	Moderate: wetness.	Slight	Slight	Slight.
21B State	Slight	Slight	Moderate: wetness.	Moderate: slope.	Slight	Slight.
22A Suffolk	Slight	Slight	Slight	Slight	Slight	Slight.
22B Suffolk	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
23A Tetotum	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
23B Tetotum	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Moderate: wetness.
24 Tomotley	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
25 Torhunta	Severe: cutbanks cave, ponding.	Severe: floods, ponding.	Severe: floods, ponding.	Severe: floods, ponding.	Severe: ponding, floods.	Severe: ponding, floods.
26*. Udorthents						

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
27*. Urban land						
28---------------- Wahee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
29---------------- Weston	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1B: Alaga	Severe: poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
2: Belhaven	Severe: wetness, percs slowly.	Severe: seepage, floods, excess humus.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
3: Bohicket	Severe: floods, ponding, percs slowly.	Severe: floods, ponding.	Severe: floods, ponding, too clayey.	Severe: floods, ponding.	Poor: too clayey, hard to pack, ponding.
4: Deloss	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
5A, 5B2: Dogue	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
6: Dragston	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, thin layer.
7A, 7B2: Emporia	Severe: wetness, percs slowly.	Moderate: seepage, wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
8A, 8B: Eunola	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness, thin layer.
9A, 9B2: Goldsboro	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
10A, 10B: Kalmia	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Good.
11: Kenansville	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
12: Kenansville	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
13: Levy	Severe: floods, ponding, percs slowly.	Severe: floods, ponding.	Severe: floods, ponding, too clayey.	Severe: floods, ponding.	Poor: too clayey, hard to pack, ponding.
14: Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
15B: Nansemond	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: too sandy, wetness.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
15D----------------- Nansemond	Severe: wetness, poor filter.	Severe: seepage, wetness, slope.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: slope, too sandy, wetness.
15E----------------- Nansemond	Severe: slope, wetness, poor filter.	Severe: seepage, wetness, slope.	Severe: seepage, wetness, slope.	Severe: seepage, slope, wetness.	Poor: slope.
16A, 16B------------ Nansemond	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: too sandy, wetness.
17------------------ Pactolus	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: too sandy, wetness.
18------------------ Pungo	Severe: percs slowly, wetness.	Severe: seepage, floods, excess humus.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, excess humus.
19------------------ Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
20A, 20B------------ Rumford	Slight-----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
21A, 21B------------ State	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Moderate: wetness.	Good.
22A, 22B------------ Suffolk	Slight-----------	Severe: seepage.	Severe: seepage.	Slight-----------	Good.
23A, 23B------------ Tetotum	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness.
24------------------ Tomotley	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
25------------------ Torhunta	Severe: floods, ponding, poor filter.	Severe: seepage, floods, ponding.	Severe: floods, seepage, ponding.	Severe: floods, seepage, ponding.	Poor: ponding.
26*. Udorthents					
27*. Urban land					
28------------------ Wahee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
29------------------ Weston	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," fair, "poor," "probable, and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1B Alaga	Good	Probable	Improbable: too sandy.	Fair: too sandy.
2 Belhaven	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
3 Bohicket	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness.
4 Deloss	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
5A, 5B2 Dogue	Fair: wetness.	Probable	Improbable: too sandy.	Poor: thin layer.
6 Dragston	Fair: wetness.	Probable	Improbable: too sandy.	Fair: thin layer.
7A, 7B2 Emporia	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
8A, 8B Eunola	Fair: wetness.	Probable	Improbable: too sandy.	Good.
9A, 9B2 Goldsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
10A, 10B Kalmia	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
11 Kenansville	Good	Probable	Improbable: too sandy.	Fair: too sandy.
12 Kenansville	Good	Probable	Improbable: too sandy.	Good.
13 Levy	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
14 Lynchburg	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
15B Nansemond	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
15D Nansemond	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
15E Nansemond	Fair: slope, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
16A, 16B Nansemond	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
17 Pactolus	Fair: wetness.	Probable	Improbable: too sandy.	Fair: too sandy.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
18 Pungo	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
19 Rains	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
20A, 20B Rumford	Good	Probable	Probable	Fair: too sandy.
21A, 21B State	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
22A, 22B Suffolk	Good	Probable	Improbable: too sandy.	Good.
23A, 23B Tetotum	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
24 Tomotley	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
25 Torhunta	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
26*. Udorthents				
27*. Urban land				
28 Wahee	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
29 Weston	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
1B----------------- Alaga	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Too sandy-------	Droughty.
2------------------ Belhaven	Moderate: seepage.	Severe: piping, wetness.	Slight----------	Subsides--------	Wetness---------	Wetness.
3------------------ Bohicket	Slight----------	Severe: hard to pack, ponding, excess salt.	Severe: slow refill, salty water.	Ponding, percs slowly, floods.	Ponding, percs slowly.	Wetness, excess salt, percs slowly.
4------------------ Deloss	Moderate: seepage.	Severe: piping, ponding.	Moderate: slow refill.	Ponding---------	Ponding, soil blowing.	Wetness.
5A----------------- Dogue	Slight----------	Severe: wetness.	Severe: slow refill.	Favorable-------	Wetness---------	Favorable.
5B2---------------- Dogue	Moderate: slope.	Severe: wetness.	Severe: slow refill.	Slope-----------	Wetness---------	Favorable.
6------------------ Dragston	Severe: seepage.	Severe: piping, wetness, seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness---------	Wetness, droughty.
7A----------------- Emporia	Moderate: seepage.	Moderate: piping, hard to pack.	Severe: no water.	Deep to water	Percs slowly----	Percs slowly.
7B2---------------- Emporia	Moderate: seepage, slope.	Moderate: piping, hard to pack.	Severe: no water.	Deep to water	Percs slowly----	Percs slowly.
8A----------------- Eunola	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable-------	Wetness---------	Favorable.
8B----------------- Eunola	Moderate: seepage, slope.	Severe: piping, wetness.	Severe: cutbanks cave.	Slope-----------	Wetness---------	Favorable.
9A----------------- Goldsboro	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Favorable-------	Wetness---------	Favorable.
9B2---------------- Goldsboro	Moderate: seepage, slope.	Severe: piping.	Moderate: deep to water, slow refill.	Slope-----------	Wetness---------	Favorable.
10A, 10B----------- Kalmia	Severe: seepage.	Moderate: seepage.	Severe: cutbanks cave.	Deep to water	Favorable-------	Favorable.
11----------------- Kenansville	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy-------	Favorable.
12----------------- Kenansville	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Too sandy-------	Favorable.
13----------------- Levy	Slight----------	Severe: hard to pack, ponding.	Severe: slow refill.	Ponding, percs slowly, floods.	Ponding, percs slowly.	Wetness, percs slowly.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
14 Lynchburg	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable	Wetness	Wetness.
15B Nansemond	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness	Droughty.
15D, 15E Nansemond	Severe: seepage, slope.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Slope, cutbanks cave.	Slope, wetness.	Slope, droughty.
16A Nansemond	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness	Favorable.
16B Nansemond	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness	Favorable.
17 Pactolus	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness	Droughty.
18 Pungo	Severe: seepage.	Severe: excess humus, wetness.	Slight	Subsides	Wetness	Wetness.
19 Rains	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable	Wetness, soil blowing.	Wetness.
20A, 20B Rumford	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.
21A, 21B State	Severe: seepage.	Moderate: piping.	Moderate: deep to water.	Deep to water	Favorable	Favorable.
22A, 22B Suffolk	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Favorable.
23A Tetotum	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Favorable	Wetness	Favorable.
23B Tetotum	Moderate: seepage, slope.	Severe: wetness.	Moderate: slow refill.	Slope	Wetness	Favorable.
24 Tomotley	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Favorable	Wetness	Wetness.
25 Torhunta	Severe: seepage.	Severe: piping, ponding.	Severe: cutbanks cave.	Ponding, floods.	Ponding	Wetness.
26*. Udorthents						
27*. Urban land						
28 Wahee	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly, slope.	Wetness, percs slowly.	Wetness, percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
29----------------- Weston	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Favorable------	Wetness---------	Wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1B Alaga	0-9	Loamy sand	SM, SW-SM, SP-SM	A-2, A-1-B	0	100	100	40-70	10-35	---	NP
	9-80	Loamy sand, loamy fine sand, fine sand.	SM, SW-SM, SP-SM	A-2	0	100	100	50-80	10-25	---	NP
2 Belhaven	0-44	Muck	Pt	A-8	---	---	---	---	---	---	---
	44-62	Loam, clay loam, silty clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	100	80-100	36-95	15-36	4-15
3 Bohicket	0-13	Silty clay loam	CH	A-7	0	100	100	100	90-100	60-100	30-60
	13-60	Silty clay, clay, sandy clay.	CH, MH	A-7	0	100	100	90-100	70-95	50-100	19-60
4 Deloss	0-17	Mucky loam, fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	100	70-95	30-65	<35	NP-7
	17-31	Sandy clay loam, clay loam, fine sandy loam.	SM-SC, SC, CL-ML, CL	A-4, A-6, A-7	0	100	100	75-100	36-70	18-45	4-22
	31-75	Variable	---	---	---	---	---	---	---	---	---
5A Dogue	0-16	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	95-100	75-100	50-100	20-50	<25	NP-10
	16-63	Clay loam, sandy clay, sandy clay loam.	CL, CH, SC	A-6, A-7	0	95-100	75-100	65-100	40-90	35-60	16-40
5B2 Dogue	0-10	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	95-100	75-100	50-100	20-50	<25	NP-10
	10-63	Clay loam, sandy clay loam, clay loam.	CL, CH, SC	A-6, A-7	0	95-100	75-100	65-100	40-90	35-60	16-40
6 Dragston	0-9	Fine sandy loam	SM, SM-SC	A-2, A-4	0	100	95-100	60-80	30-50	12-20	NP-8
	9-37	Fine sandy loam, sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2, A-4	0	100	95-100	60-85	30-50	18-25	NP-10
	37-66	Loamy sand, loamy fine sand, sand.	SM, SP-SM	A-2, A-3	0	95-100	85-100	35-70	5-30	17-18	NP-7
7A Emporia	0-10	Fine sandy loam	CL, SC, SM, ML	A-2, A-4	0-3	90-100	75-100	50-95	25-65	<25	NP-15
	10-41	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	75-100	45-95	25-70	20-50	8-30
	41-72	Sandy clay loam, clay loam, clay.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	75-100	45-95	30-80	25-50	8-30
7B2 Emporia	0-6	Fine sandy loam	CL, SC, SM, ML	A-2, A-4	0-3	90-100	75-100	50-95	25-65	<25	NP-15
	6-37	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	75-100	45-95	25-70	20-50	8-30
	37-72	Sandy clay loam, clay loam, clay.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	75-100	45-95	30-80	25-50	8-30
8A, 8B Eunola	0-9	Loamy fine sand	SM	A-2	0	100	100	50-80	15-35	---	NP
	9-45	Sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-4, A-2	0	100	100	75-95	30-45	<30	NP-10
	45-63	Sandy clay loam, fine sandy loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0	100	100	80-95	36-60	15-30	2-15

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
9A---------------- Goldsboro	0-18	Fine sandy loam	SM, SM-SC, SC	A-2, A-4, A-6	0	90-100	75-100	50-95	15-45	<25	NP-14
	18-70	Sandy clay loam, loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	60-95	25-55	16-35	4-16
9B2--------------- Goldsboro	0-11	Fine sandy loam	SM, SM-SC, SC	A-2, A-4, A-6	0	90-100	75-100	50-95	15-45	<25	NP-14
	11-70	Sandy clay loam, loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	60-95	25-55	16-35	4-16
10A, 10B---------- Kalmia	0-22	Fine sandy loam	SM, SM-SC, SC	A-2, A-4	0	100	95-100	50-75	15-40	<25	NP-10
	22-34	Sandy clay loam	SC, SM-SC	A-2, A-4, A-6	0	100	95-100	70-90	30-49	20-35	4-15
	34-72	Loamy fine sand, sand fine sandy loam.	SM, SP-SM, SP	A-2, A-3	0	100	95-100	50-70	4-25	---	NP
11---------------- Kenansville	0-23	Loamy sand-------	SM, SP-SM	A-1, A-2	0	100	95-100	45-100	10-25	<25	NP-3
	23-48	Sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	95-100	50-100	20-40	<30	NP-10
	48-72	Sand, loamy sand	SP-SM, SM	A-1, A-2, A-3	0	100	95-100	40-100	5-30	---	NP
12---------------- Kenansville	0-23	Loamy sand-------	SM, SP-SM	A-1, A-2	0	100	95-100	45-100	10-25	<25	NP-3
	23-48	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4	0	100	95-100	50-100	20-40	<30	NP-10
	48-72	Sand, loamy sand	SP-SM, SM	A-1, A-2, A-3	0	100	95-100	40-100	5-30	---	NP
13---------------- Levy	0-10	Silty clay loam	CL, CH, ML, MH	A-6, A-7	0	100	100	100	85-100	30-65	12-35
	10-60	Silty clay, clay	CL, CH, ML, MH	A-6, A-7	0	100	100	100	85-100	35-65	15-35
14---------------- Lynchburg	0-13	Fine sandy loam	SM, ML	A-2, A-4	0	92-100	90-100	55-100	25-65	<30	NP-7
	13-63	Sandy clay loam, sandy loam, clay loam.	SM-SC, SC, CL, CL-ML	A-2, A-4, A-6	0	12-100	90-100	70-100	25-65	15-40	4-18
15B, 15D, 15E----- Nansemond	0-19	Loamy fine sand	SM	A-2, A-4	0	100	95-100	45-95	15-50	<20	NP-7
	19-29	Fine sandy loam, sandy loam.	SM, SM-SC, SC	A-2, A-4, A-6	0	100	95-100	60-85	30-50	<25	NP-15
	29-66	Loamy fine sand, loamy sand.	SM, SM-SC	A-2, A-4	0	100	95-100	45-95	15-50	<25	NP-10
	66-70	Fine sand, loamy sand.	SM, SM-SC, SP-SM	A-2, A-3, A-4	0	95-100	75-100	40-95	5-50	<25	NP-7
16A, 16B---------- Nansemond	0-8	Fine sandy loam	SM, SM-SC	A-2, A-4	0	100	95-100	60-80	30-50	<25	NP-10
	8-29	Fine sandy loam, sandy loam.	SM, SM-SC, SC	A-2, A-4, A-6	0	100	95-100	60-85	30-50	<25	NP-15
	29-66	Loamy fine sand, loamy sand.	SM, SM-SC	A-2, A-4	0	100	95-100	45-95	15-50	<25	NP-10
	66-70	Fine sand, loamy sand.	SM, SM-SC, SP-SM	A-2, A-3, A-4	0	95-100	75-100	40-95	5-50	<25	NP-7
17---------------- Pactolus	0-38	Loamy fine sand	SM	A-2	0	100	90-100	51-95	13-30	---	NP
	38-80	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	90-100	51-95	5-30	---	NP
18---------------- Pungo	0-102	Muck--------------	Pt	A-8	---	---	---	---	---	---	---
	102-110	Silty clay--------	CH	A-7	0	100	100	85-100	75-95	35-65	15-35
19---------------- Rains	0-6	Fine sandy loam	SM, ML	A-2, A-4	0	100	95-100	50-85	25-55	<35	NP-10
	6-65	Sandy clay loam, loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	100	95-100	65-100	30-70	18-40	4-18

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
20A, 20B--------- Rumford	0-10	Loamy fine sand	SM	A-2, A-1	0	90-100	85-100	45-75	15-30	<20	NP
	10-36	Fine sandy loam, sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	80-100	75-100	55-85	30-50	<34	NP-12
	36-72	Stratified sandy loam, loamy sand, sand.	SM, SP, GP, GM	A-1, A-2, A-3, A-4	0	50-100	35-100	20-85	2-40	<25	NP-6
21A, 21B--------- State	0-22	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	95-100	95-100	65-100	40-85	<35	NP-7
	22-52	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	95-100	95-100	75-100	35-80	24-40	8-25
	52-65	Stratified sand to fine sandy loam.	SM, SM-SC, SP-SM	A-2, A-3, A-4	0	85-100	75-100	40-90	5-50	<25	NP-7
22A, 22B--------- Suffolk	0-11	Loamy sand--------	SM	A-1, A-2, A-4	0	95-100	90-100	40-85	15-40	<18	NP-6
	11-38	Sandy clay loam, clay loam, sandy loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	95-100	90-100	50-95	25-75	20-40	10-25
	38-65	Loamy fine sand, fine sandy loam.	SP, SM, SM-SC	A-1, A-2, A-3, A-4	0	75-100	60-100	30-80	3-50	<18	NP-7
23A, 23B--------- Tetotum	0-20	Fine sandy loam	SM, ML	A-2, A-4	0	85-100	75-100	45-85	25-55	<30	NP-7
	20-65	Sandy clay loam, clay loam, loam.	SC, CL	A-6, A-7	0-2	85-100	75-100	60-95	35-85	30-45	10-20
	65-85	Stratified sandy loam, sand.	SM, SC, ML, CL	A-2, A-4, A-6	0-2	80-100	75-100	50-95	15-75	<30	NP-15
24--------------- Tomotley	0-7	Loam--------------	ML	A-4	0	100	95-100	75-100	51-95	<40	NP-10
	7-43	Fine sandy loam, sandy clay loam, clay loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	100	95-100	75-100	30-70	20-40	6-18
	43-61	Variable----------	---	---	---	---	---	---	---	---	---
25--------------- Torhunta	0-16	Loam--------------	SM	A-2, A-4	0	100	95-100	70-85	20-49	---	NP
	16-30	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	100	95-100	70-85	20-40	---	NP
	30-65	Loamy sand, sand, sandy loam.	SM, SP-SM	A-2, A-3	0	100	95-100	65-85	5-25	---	NP
26*. Udorthents											
27*. Urban land											
28--------------- Wahee	0-4	Silt loam---------	ML, CL-ML, CL	A-4	0	100	100	90-100	50-75	20-35	2-10
	4-46	Clay, clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	85-100	50-90	38-60	18-32
	46-62	Variable----------	---	---	---	---	---	---	---	---	---
29--------------- Weston	0-8	Fine sandy loam	ML, SM	A-4	0	100	100	80-95	40-65	<20	NP-3
	8-39	Sandy loam, loam, fine sandy loam.	SM, SM-SC, ML, CL-ML	A-4	0	100	100	80-95	45-70	<25	NP-5
	39-62	Stratified sand to clay.	SM, ML, CL, CL-ML	A-4, A-6	0	100	95-100	80-95	40-75	<35	NP-15

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
1B	0-9	2-12	1.30-1.50	>6.0	0.05-0.09	4.5-6.0	Low	0.17	5	.5-1
Alaga	9-80	2-12	1.30-1.50	>6.0	0.05-0.09	4.5-6.0	Low	0.17		
2	0-44	---	0.40-0.65	0.2-6.0	0.20-0.26	<4.5	Low	----	---	20-80
Belhaven	44-62	10-35	1.30-1.45	0.2-0.6	0.12-0.20	3.6-6.5	Low	0.24		
3	0-13	30-60	1.20-1.40	0.06-0.2	0.14-0.18	6.1-8.4	High	0.32	5	---
Bohicket	13-60	35-60	1.30-1.60	<0.06	0.12-0.16	6.1-8.4	High	0.24		
4	0-17	5-20	1.20-1.50	2.0-6.0	0.10-0.16	4.5-6.5	Low	0.28	5	2-9
Deloss	17-31	18-35	1.30-1.60	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.24		
	31-75	---	---	---	---	---	-----------	----		
5A	0-16	5-10	1.35-1.50	2.0-6.0	0.08-0.15	3.6-5.5	Low	0.28	4	.5-1
Dogue	16-63	35-50	1.45-1.60	0.2-0.6	0.12-0.19	3.6-5.5	Moderate	0.28		
5B2	0-10	5-10	1.35-1.50	2.0-6.0	0.08-0.15	3.6-5.5	Low	0.28	4	.5-1
Dogue	10-63	35-50	1.45-1.60	0.2-0.6	0.12-0.19	3.6-5.5	Moderate	0.28		
6	0-9	4-12	1.20-1.50	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.17	4	.5-1
Dragston	9-37	10-20	1.25-1.45	2.0-6.0	0.08-0.16	4.5-5.5	Low	0.17		
	37-66	2-12	1.35-1.55	>6.0	0.04-0.08	4.5-5.5	Low	0.17		
7A	0-10	7-18	1.30-1.40	2.0-6.0	0.10-0.17	4.5-5.5	Low	0.28	4	<3
Emporia	10-41	18-35	1.35-1.45	0.2-2.0	0.10-0.18	4.5-5.5	Low	0.28		
	41-72	21-40	1.45-1.60	0.06-0.6	0.10-0.16	4.5-5.5	Moderate	0.20		
7B2	0-6	7-18	1.30-1.40	2.0-6.0	0.10-0.17	4.5-5.5	Low	0.28	4	<3
Emporia	6-37	18-35	1.35-1.45	0.2-2.0	0.10-0.18	4.5-5.5	Low	0.28		
	37-72	21-40	1.45-1.60	0.06-0.6	0.10-0.16	4.5-5.5	Moderate	0.20		
8A, 8B	0-9	3-11	1.25-1.40	2.0-6.0	0.06-0.11	4.5-5.5	Low	0.28	4	.5-2
Eunola	9-45	18-35	1.30-1.40	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.28		
	45-63	18-45	1.30-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.32		
9A	0-18	5-15	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20	5	.5-4
Goldsboro	18-70	18-25	1.30-1.50	0.6-2.0	0.11-0.15	4.5-5.5	Low	0.2		
9B2	0-11	5-15	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20	5	.5-4
Goldsboro	11-70	18-25	1.30-1.50	0.6-2.0	0.11-0.15	4.5-5.5	Low	0.24		
10A, 10B	0-22	4-12	1.60-1.75	2.0-6.0	0.06-0.10	4.5-6.0	Low	0.20	4	.5-2
Kalmia	22-34	18-35	1.40-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.24		
	34-72	2-10	1.60-1.75	6.0-20	0.03-0.06	4.5-5.5	Low	0.10		
11	0-23	3-10	1.50-1.70	6.0-20	0.04-0.10	4.5-6.0	Low	0.15	5	.5-2
Kenansville	23-48	5-18	1.30-1.50	2.0-6.0	0.10-0.14	4.5-6.0	Low	0.15		
	48-72	1-10	1.50-1.70	6.0-20	<0.05	4.5-6.0	Low	0.10		
12	0-23	3-10	1.50-1.70	6.0-20	0.04-0.10	4.5-6.0	Low	0.15	5	.5-2
Kenansville	23-48	5-18	1.30-1.50	2.0-6.0	0.10-0.15	4.5-6.0	Low	0.15		
	48-72	1-10	1.50-1.70	6.0-20	<0.05	4.5-6.0	Low	0.10		
13	0-10	27-60	1.20-1.40	0.06-0.2	0.16-0.22	3.6-5.5	High	0.32	5	---
Levy	10-60	60-80	1.30-1.60	0.06-0.2	0.16-0.22	3.6-5.5	High	0.32		
14	0-13	5-20	1.30-1.60	2.0-6.0	0.09-0.13	3.6-5.5	Low	0.20	4	.5-5
Lynchburg	13-63	18-35	1.30-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.20		
15B, 15D, 15E	0-19	4-12	1.20-1.45	2.0-20	0.05-0.10	4.5-5.5	Low	0.15	3	.5-1
Nansemond	19-29	10-20	1.25-1.45	2.0-6.0	0.09-0.14	4.5-5.5	Low	0.17		
	29-66	4-12	1.30-1.55	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.15		
	66-70	2-12	1.35-1.55	6.0-20	0.02-0.10	3.6-5.5	Low	0.15		

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
16A, 16B--------- Nansemond	0-8	6-15	1.20-1.50	2.0-6.0	0.08-0.13	4.5-5.5	Low-----------	0.20	3	1-2
	8-29	10-20	1.25-1.45	2.0-6.0	0.09-0.14	4.5-5.5	Low-----------	0.17		
	29-66	4-12	1.30-1.55	2.0-6.0	0.05-0.10	3.6-5.5	Low-----------	0.1		
	66-70	2-12	1.35-1.55	6.0-20	0.02-0.10	3.6-5.5	Low-----------	0.15		
17--------------- Pactolus	0-38	2-10	---	6.0-20	0.05-0.10	4.5-6.0	Low-----------	0.10	4	---
	38-80	2-10	---	6.0-20	0.03-0.0	4.5-5.5	Low-----------	0.10		
18--------------- Pungo	0-102	---	0.35-0.60	0.2-6.0	0.20-0.26	<4.5	Low-----------	----	---	40-90
	102-110	30-45	1.25-1.40	0.2-0.6	0.12-0.18	3.6-5.5	Moderate------	----	----	---
19--------------- Rains	0-6	5-20	1.30-1.60	2.0-6.0	0.08-0.12	4.5-6.5	Low-----------	0.17	5	1-6
	6-65	18-35	1.30-1.50	0.6-2.0	0.10-0.15	4.5-5.5	Low-----------	0.24		
20A, 20B--------- Rumford	0-10	2-12	1.25-1.45	>6.0	0.06-0.10	3.6-5.5	Low-----------	0.24	4	.5-1
	10-36	8-18	1.25-1.45	2.0-6.0	0.10-0.15	4.5-6.0	Low-----------	0.17		
	36-72	2-18	1.25-1.50	>2.0	0.04-0.10	3.6-6.5	Low-----------	0.17		
21A, 21B--------- State	0-22	5-15	1.25-1.40	0.6-6.0	0.10-0.20	4.5-5.5	Low-----------	0.28	4	<2
	22-52	18-34	1.35-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low-----------	0.28		
	52-65	2-15	1.35-1.50	>2.0	0.02-0.10	4.5-6.0	Low-----------	0.17		
22A, 22B--------- Suffolk	0-11	4-10	1.40-1.50	2.0-20	0.06-0.10	3.6-5.5	Low-----------	0.24	4	.5-1
	11-38	10-33	1.40-1.50	0.6-2.0	0.12-0.20	3.6-5.5	Low-----------	0.28		
	38-65	4-10	1.40-1.50	2.0-20	0.04-0.10	3.6-6.0	Low-----------	0.17		
23A, 23B--------- Tetotum	0-20	5-15	1.20-1.40	2.0-6.0	0.08-0.15	3.6-5.5	Low-----------	0.32	4	.5-2
	20-65	18-35	1.25-1.45	0.6-2.0	0.14-0.19	3.6-5.5	Low-----------	0.32		
	65-85	5-30	1.25-1.45	0.6-20	0.06-0.15	3.6-5.5	Low-----------	0.24		
24--------------- Tomotley	0-7	5-27	1.20-1.40	2.0-6.0	0.12-0.18	3.6-5.5	Low-----------	0.20	5	1-6
	7-43	18-35	1.30-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low-----------	0.20		
	43-61	---	---	---	---	---	--------------	----		
25--------------- Torhunta	0-16	5-15	1.30-1.50	2.0-6.0	0.10-0.15	3.6-5.5	Low-----------	0.15	---	---
	16-30	5-18	1.30-1.50	2.0-6.0	0.10-0.15	3.6-5.5	Low-----------	0.15		
	30-65	5-20	1.30-1.50	6.0-20	<0.05	3.6-5.5	Low-----------	0.10		
26*. Udorthents										
27*. Urban land										
28--------------- Wahee	0-4	10-27	1.20-1.50	0.2-2.0	0.15-0.20	4.5-5.5	Low-----------	0.28	5	.5-5
	4-46	35-55	1.40-1.60	0.06-0.2	0.12-0.20	4.5-5.5	Moderate------	0.28		
	46-62	---	---	0.2-0.6	0.12-0.20	4.5-5.5	Moderate------	0.28		
29--------------- Weston	0-8	5-15	1.30-1.50	0.6-2.0	0.10-0.15	4.5-6.0	Low-----------	0.24	5	1-3
	8-39	5-18	1.30-1.50	0.2-0.6	0.10-0.20	4.5-5.0	Low-----------	0.24		
	39-62	5-18	1.20-1.50	0.06-6.0	0.10-0.18	4.5-5.0	Low-----------	0.32		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the text explain terms such as "rare," "brief," "apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
1B------------------ Alaga	A	None---------	---	---	4.0-6.0	Apparent	Jan-Mar	>60	---	Low-------	Moderate.
2------------------- Belhaven	D	Rare---------	---	---	0-1.0	Apparent	Dec-May	>60	---	High------	High.
3------------------- Bohicket	D	Frequent----	Very brief	Jan-Dec	+3-0	Apparent	Jan-Dec	>60	---	High------	High.
4------------------- Deloss	D	None---------	---	---	+1-1.0	Apparent	Nov-Apr	>60	---	High------	High.
5A, 5B2------------ Dogue	C	None---------	---	---	1.5-3.0	Apparent	Jan-Mar	>60	---	High------	High.
6------------------- Dragston	C	None---------	---	---	1.0-2.5	Apparent	Nov-Apr	>60	---	Low-------	High.
7A, 7B2------------ Emporia	C	None---------	---	---	3.0-4.5	Perched	Nov-Apr	>60	---	Moderate	High.
8A, 8B------------- Eunola	C	None---------	---	---	1.5-2.5	Apparent	Nov-Mar	>60	---	Low-------	High.
9A, 9B2------------ Goldsboro	B	None---------	---	---	2.0-3.0	Apparent	Dec-Mar	>60	---	Moderate	High.
10A, 10B----------- Kalmia	B	None---------	---	---	4.0-6.0	Apparent	Dec-Apr	>60	---	Moderate	Moderate.
11------------------ Kenansville	A	None---------	---	---	>6.0	---	---	>60	---	Low-------	High.
12------------------ Kenansville	A	None---------	---	---	4.0-6.0	Apparent	Dec-Apr	>60	---	Low-------	High.
13------------------ Levy	D	Frequent----	Very long	Jan-Dec	+2-+1	Apparent	Jan-Dec	>60	---	High------	High.
14------------------ Lynchburg	B/D	None---------	---	---	0.5-1.5	Apparent	Nov-Apr	>60	---	High------	High.
15B, 15D, 15E, 16A, 16B---------- Nansemond	C	None---------	---	---	1.5-2.5	Apparent	Dec-Apr	>60	---	Moderate	High.
17------------------ Pactolus	C	None to rare	---	---	1.5-2.5	Apparent	Jan-Mar	>60	---	Low-------	High.
18------------------ Pungo	D	Rare---------	---	---	0-1.0	Apparent	Dec-May	>60	---	High------	High.
19------------------ Rains	B/D	None---------	---	---	0-1.0	Apparent	Nov-Apr	>60	---	High------	High.
20A, 20B----------- Rumford	A	None---------	---	---	>6.0	---	---	>60	---	Low-------	High.
21A, 21B----------- State	B	None---------	---	---	4.0-6.0	Apparent	Dec-Jun	>60	---	Moderate	High.
22A, 22B----------- Suffolk	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High.
23A, 23B----------- Tetotum	C	None---------	---	---	1.5-2.5	Apparent	Dec-Apr	>60	---	High------	High.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
24----------------- Tomotley	B/D	None---------	---	---	0-1.0	Apparent	Dec-Mar	>60	---	High------	High.
25----------------- Torhunta	C	Frequent----	Long------	Jan-Apr	+.5-1.5	Apparent	Nov-Apr	>60	---	High------	High.
26*. Udorthents											
27*. Urban land											
28----------------- Wahee	D	None---------	---	---	0.5-1.5	Apparent	Dec-Mar	>60	---	High------	High.
29----------------- Weston	D	None---------	---	---	0-1.0	Perched	Dec-Apr	>60	---	High------	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Alaga	Thermic, coated Typic Quartzipsamments
Belhaven	Loamy, mixed, dysic, thermic Terric Medisaprists
Bohicket	Fine, mixed, nonacid, thermic Typic Sulfaquents
Deloss	Fine-loamy, mixed, thermic Typic Umbraquults
Dogue	Clayey, mixed, thermic Aquic Hapludults
Dragston	Coarse-loamy, mixed, thermic Aeric Ochraquults
Emporia	Fine-loamy, siliceous, thermic Typic Hapludults
Eunola	Fine-loamy, siliceous, thermic Aquic Hapludults
*Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
*Kalmia	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic Typic Hapludults
Kenansville	Loamy, siliceous, thermic Arenic Hapludults
*Levy	Very-fine, mixed, acid, thermic Typic Hydraquents
Lynchburg	Fine-loamy, siliceous, thermic Aeric Paleaquults
Nansemond	Coarse-loamy, siliceous, thermic Aquic Hapludults
Pactolus	Thermic, coated Aquic Quartzipsamments
Pungo	Dysic, thermic Typic Medisaprists
*Rains	Fine-loamy, siliceous, thermic Typic Paleaquults
*Rumford	Coarse-loamy, siliceous, thermic Typic Hapludults
State	Fine-loamy, mixed, thermic Typic Hapludults
Suffolk	Fine-loamy, siliceous, thermic Typic Hapludults
Tetotum	Fine-loamy, mixed, thermic Aquic Hapludults
Tomotley	Fine-loamy, mixed, thermic Typic Ochraquults
Torhunta	Coarse-loamy, siliceous, acid, thermic Typic Humaquepts
Udorthents	Udorthents
Wahee	Clayey, mixed, thermic Aeric Ochraquults
Weston	Coarse-loamy, siliceous, thermic Typic Ochraquults

☆U.S. GOVERNMENT PRINTING OFFICE : 1981—331-831/106

Accessibility Statement

The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at (800) 457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The USDA Target Center can convert USDA information and documents into alternative formats, including Braille, large print, video description, diskette, and audiotape. For more information, visit the TARGET Center's Web site (http://www.targetcenter.dm.usda.gov/) or call (202) 720-2600 (Voice/TTY).

Nondiscrimination Policy

The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers, employees, and applicants for employment on the basis of race, color, national origin, age, disability, sex, gender identity, religion, reprisal, and where applicable, political beliefs, marital status, familial or parental status, sexual orientation, whether all or part of an individual's income is derived from any public assistance program, or protected genetic information. The Department prohibits discrimination in employment or in any program or activity conducted or funded by the Department. (Not all prohibited bases apply to all programs and/or employment activities.)

To File an Employment Complaint

If you wish to file an employment complaint, you must contact your agency's EEO Counselor (http://directives.sc.egov.usda.gov/33081.wba) within 45 days of the date of the alleged discriminatory act, event, or personnel action. Additional information can be found online at http://www.ascr.usda.gov/complaint_filing_file.html.

To File a Program Complaint

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found online at http://www.ascr.usda.gov/complaint_filing_cust.html or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter by mail to U.S. Department of Agriculture; Director, Office of Adjudication; 1400 Independence Avenue, S.W.; Washington, D.C. 20250-9419; by fax to (202) 690-7442; or by email to program.intake@usda.gov.

Persons with Disabilities

If you are deaf, are hard of hearing, or have speech disabilities and you wish to file either an EEO or program complaint, please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

If you have other disabilities and wish to file a program complaint, please see the contact information above. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.), please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).